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GET YOUR HANDS OUT OF MY DRAWERS: A SURVEY OF INFORMATION OWNERSHIP AND STEWARDSHIP AT THE AIR FORCE INSTITUTE OF TECHNOLOGY

THESIS

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AFIT/GIS/LAS/97D-2

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THESIS

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Acknowledgments

Having reached the end of this long, languorous journey, it is now time to thank those who carried me when I was too tired to walk. Although my name appears on the title page, this thesis could not have been written without the help of others.

I owe many thanks to my thesis advisor, Dr. Alan Heminger, and my reader, Major Bill Scott. Dr. Heminger, whose gentle prodding led me to this topic, guided me back on course when I marched off into the weeds. His passion for the subject allowed me to plod onward, even when my enthusiasm waned. Major Scott's wisdom guided me through the nasty forest of statistics—holding my hand when SAS gremlins got too close. His desire to "torture the data until it confesses" let me apply lessons long forgotten.

I owe special gratitude to my family. Thanks to my son, Keith, who stepped in as the man of the house while his father toiled away at work. Bless him for understanding the go-cart will have to wait just a little while longer. Thanks to Kelly, who maintained her sweet disposition long after her daddy lost his. Bless her for allowing me those precious moments together as we discovered the joy of reading. I owe special thanks to my lovely wife, Terri, who understood when I left for work as she arrived home from hers, when I arrived home from school as the kids were leaving for theirs, and when I was grumpy (more than usual). She survived the long hours and endless separation—ending her tenure as an AFIT widow.

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Keith E. Kolekofski, Jr.

Table of Contents

Page

Page

List of Figures

Page

List of Tables

Page

Abstract

Despite beliefs in the benefits of good Information Resources Management (IRM) practices, executives still find their organizations plagued by outdated, inconsistent, and unavailable information. This information is often stored in disparate, stand-alone systems spread throughout the business. The Air Force Institute of Technology (AFIT) fails to reap the synergistic benefits of shared information despite its bounty of information systems and proclamations for IRM principles. A previous researcher postulated that this disconnect may be explained, in part, by an ownership attitude at the functional level. Empirical evidence, gathered from a survey of AFIT's members, failed to support this postulate. Exploratory factor analysis of the data revealed three constructs that may help explain information sharing from the individual's point of view. In addition, a model of factors that contribute to information sharing is proposed.

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I. Introduction

> "Neither do men light a candle, and put it under a bushel, but on a candlestick; and it giveth light unto all that are in the house."
> (Matthew 5:15)

Overview

This wisdom, handed down two thousand years ago, is analogous to how information is often handled today. Despite the certitude that "information is a major corporate resource and must be managed using the same basic principles used to manage other assets" (McFadden and Hoffer, 1994:6), the advantages of shared information are often overlooked. In many cases, individuals assume they own the information with which they work. This philosophy results in keeping information within a functional stovepipe—negating the synergistic benefits derived from sharing it.

An analysis of AFIT's information needs and capabilities revealed the organization maintained a bounty of information systems (IS); Figure 1 displays the systems supported by AFIT. Yet despite its abundance of IS, the organization suffered from a "lack of knowledge about where information is stored." Second, many employees "did not understand how to use the information systems that [were] available." Third, no

comprehensive information strategic plan existed to guide the implementation of IS resources to support the unit's mission (Heminger and others, 1996:20). Therefore, decision-makers—tasked to develop strategic, tactical, and operational plans—were hampered by inconsistent, outdated, and unavailable information.

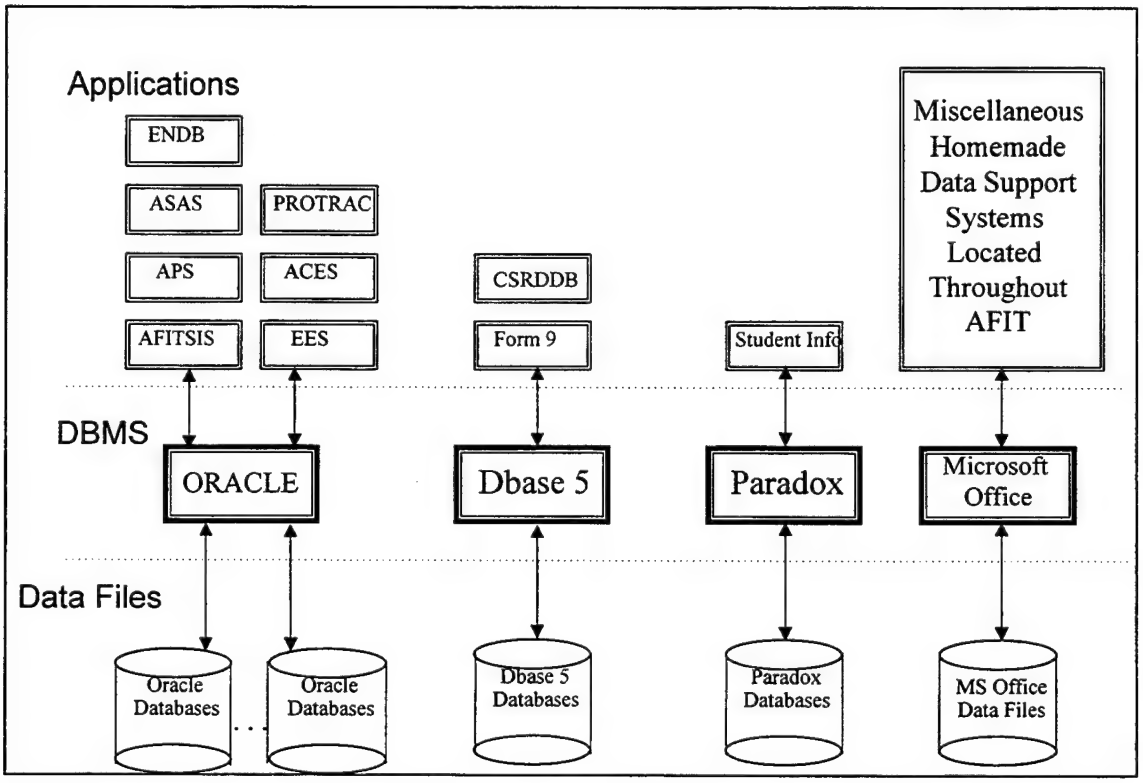

Figure 1. Information Systems Supported by AFIT
(Heminger and others, 1996:7)

In his thesis, Plant concludes AFIT "had not fully implemented the principles of IRM [Information Resources Management], but had been successful with some components" (1996:56). AFIT, therefore, was an example of an organization that "fail[ed] to manage information in a manner appropriate to a valuable resource, despite [its] proclamations of support for the IRM philosophy" (Plant, 1996:56). Plant's analysis

is based on AFIT's disparate, stand-alone information systems, the lack of an enterprise-wide information policy, and on anecdotal data. His research explored sub-unit (functional level) ownership as a possible source of AFIT's failure to support good IRM practices. Plant noted evidence (1996:55) that functional areas within the organization kept information to themselves—put it under a bushel. By their actions, they prevented the organization from reaping the benefits of shared information—providing light to all in the house. In other words, the functional areas displayed characteristics of owning the information with which they worked (information ownership), rather than maintaining the information for the good of the organization (information stewardship).

Research Question

Despite distinct feelings concerning the apparent ownership of information, limited empirical data has been gathered to prove a division between information owners and stewards exists. Therefore, this study will attempt to answer the following:

- **Is there evidence that individuals within an organization hold attitudes about information ownership versus stewardship that can be differentiated?**

Study's Questions

Plant examined AFIT *in toto*. Yet, because an organization is actually a reflection of its members, empirical data will be gathered to examine how AFIT's employees view themselves regarding information ownership and stewardship. Because the discriminating characteristic is the individual's attitude towards sharing information, the

results of this study will undoubtedly shed light on the sharing process as well. This study will answer the following questions:

- **Can distinct definitions for information owners and stewards be provided?**
- **Do individuals at AFIT view themselves strictly as information owners or is there a variety of attitudes concerning their responsibility for information?**
- **Do individuals within particular functional areas view themselves (as information owners or stewards) in a manner that is significantly different from the remaining functional areas?**

Propositions

Despite verbal support for IRM, AFIT's leadership has not implemented the necessary structural and organizational measures to improve information sharing. The following weaknesses were identified at AFIT:

- No Chief Information Officer, Data Administrator, or Database Administrator
- No information strategic plan
- Lack of an enterprise-wide view of data
- Inability to obtain or identify necessary information
- Information stored in multiple databases resulting in inconsistency and redundancy
- Proprietary IS located at the functional level (Plant, 1996:51-54)

Considering Plant's postulation that AFIT's inadequacies regarding managing information result from ownership behaviors at the functional level, the following proposition is expected to be true:

- **Individuals at AFIT will view themselves as owners of information.**

Because the Communication and Information directorate (SC) plays a predominant role in implementing IRM measures, failures in these areas are mainly a result of the actions (or inactions) of SC. If an ownership attitude does, indeed, exist at the functional area level, then surely SC should aggregately display an ownership attitude. Likewise, because the remaining functional areas have a less visible role in spearheading IRM policies regarding the implementation of IS, they would not necessarily display ownership behaviors. Therefore, the following is proposed:

- **Individuals within SC will view themselves as information owners; this determination will be statistically significant from the remaining functional areas.**

Significance of the Study

This study will provide empirical evidence of individuals' view of information and their responsibility for it. The study's results will be useful in better understanding beliefs about information and how these beliefs affect how information is used. This research may help explain decisions leading to suboptimal use of organizational information. In addition, an examination of the information sharing process may help distinguish which factors are necessary for sharing to occur. The findings may have important significance for managers at all levels within the Air Force.

Summary

This research is a follow-up study to examine Plant's proposition of an information ownership attitude at the subunit levels of AFIT. This chapter has introduced the stream of research and alluded to where the results will take us. Chapter II

summarizes a literature review of the pertinent topics for this study—information ownership, information stewardship, and the process of sharing information. Chapter III details the methodology used to gather survey data from the study's sample. The results and analysis are discussed in Chapter IV. Finally, the implications of the study's results and suggested topics for future research are addressed.

II. Literature Review

Overview

The concept of information ownership has recently been addressed in IRM journals. Researchers have noted increased investments in IS do not guarantee productivity gain. Several have suggested an ownership attitude as a possible cause of this contradiction. Because the concept of information ownership is inseparably fused with the notion of information sharing, determinants to the sharing process are also addressed in this study.

Information Resource Management

Today's operating environment requires IS that will "align [themselves with] ... the needs of the enterprise and ... be both more responsive to competitive and strategic pressures and more cost-effective in delivering solutions to the business" (Sullivan-Trainor, 1989:71). These uncompromising demands, matched with the ceaseless advancements in technology, have spawned a proliferation of computer systems. Ubiquitous computers have forever altered our view of data and (the resultant) information. Information is no longer considered merely a cost of doing business; today, information is seen as a resource that provides tremendous strategic advantages for the organization that uses it well.

Richard Nolan, writing in his celebrated article, "Computer Data Bases: The Future is Now," was one of the first to document the examination of information's

increasing importance. Management, he said, "should begin to think of data as a basic resource. It should accept this idea as a natural consequence of functional specialization of the general management function" (Nolan, 1973:114).

Nolan's pronouncement was the foundation of a new discipline entitled Information Resource Management; this philosophy advocates applying sound management principles to information. Proponents of IRM often proclaim its many benefits which include:

- The value of data is optimized when data is managed to be shared by many applications and knowledge workers.
- Processes are managed to maximize value-adding activities and eliminate no-value-adding activities.
- Technology is exploited to achieve the value of both data and process for enabling just-in-time informating (sic) (English, 1996:65).
- It is important for the cost-effective operation and development of information systems (Martin and others, 1991:501).

Application-independent information, however, only reaps value-added benefits if the information is consistent, accurate, timely, economically feasible, and relevant (Fitzgerald and Dennis, 1996:394).

Productivity Paradox

Nolan's foreshadowing of "data bases" highlighted the importance of sharing information across applications (1973:105). Yet, continual improvement in the ability to manipulate information has not been the necessary ingredient for instant productivity. Despite an enormous investment in information technology (IT), there has been no clearly measured positive effect on the US economy. In fact, "looking at the economy as a whole, ... there has been no or even a negative correlation between investments in IT

and the productivity of a company" (Petrovic, 1995:881). This productivity paradox is a factor across many industries. "In spite of increasing growth rates of IT investments in the last decades, there had been a decline in the growth of productivity both in manufacturing and non-manufacturing business" (Petrovic, 1995:881). There is, however, disagreement concerning the validity of the productivity paradox and its implications (Ives, 1994:xxi).

It has been noted that information is a resource that should be aligned with the business objectives in order to maximize its usefulness. History has shown, however, organizations continually falter in their implementation of IRM principles. Why, then, are companies failing to reap the benefits of IRM? Researchers have suggested the existence of an information ownership attitude that dampens the synergistic benefits of shared information. They suggest an information stewardship attitude as a viable alternative (Weldon, 1986:56; Martin and others, 1991:517; English, 1993:54; Plant, 1996:7).

Defining Information Ownership and Information Stewardship

Several researchers have suggested the existence of two groups with differing opinions regarding how information should be viewed and used. The central tenet separating information owners from information stewards is the individual's willingness to share the information he or she possesses.

Information Ownership. "It used to be whoever had the [information] owned it. All rights and responsibilities ... fell to this individual or organizational unit" (Weldon, 1986:55). The following anecdote highlights the existence of an ownership attitude:

> A major barrier in many organizations is that many people who create data that they use feel they "own" it. Since it supports their own processes and no one else uses the data directly from that file or database, it is obviously "their" data. This was plainly illustrated during a recent executive management presentation on shared data as an enterprise resource. I asked the senior managers, "Who owns the personnel data?" A hand shot up, and the [Vice President] of [Human Resources] responded emphatically, "I do!" (English, 1997)

The definition of information owner, as used in this study, extends beyond the individual with the legal control over and economic interest in the information. An information owner can be described as someone with a reluctance to share information as intended by good IRM practices (Martin and others, 1991:517; Constant and others, 1994:400). "The decentralization of information management raises the possibility that units controlling specific information repositories may not readily make them available ... to other units, leading to poor organizational payoff" (Barua and Ravindran, 1996:261). Several reasons have been given for this reticence:

- Need to protect person privacy
- Need to protect trade secrets
- Requirement to allow only those with a need to know to see sensitive business plans
- Desire to promote internal competition and to justify the use of scarce resources
- Desire to promote commitment to and ownership of one's job (Martin and others, 1991:517)

Plant postulated an ownership attitude existed in the functional areas of AFIT.

> The ownership behaviours exhibited included creation of separate systems to manage information particular to their task, often created from information originally obtained from the primary information systems. These systems were treated proprietarily, with their existence, while not concealed, definitely not advertised to the existing information management structure. This attitude of ownership of information, as determined from the behaviours exhibited, contributes to the propagation of unmanaged, uncontrolled information sources that readily confound the organisations [sic] view of its information base. (Plant: 1996:59)

Information Stewardship. In the past, a steward was one who managed the household affairs for another. "In other words, the steward does not own the resource; he or she is the custodian, actively managing it for someone else" (English, 1993:54). Information stewards, therefore, maintain information on behalf of the entire enterprise, rather than their functional area. Hence, stewards are inclined to share information with others in the organization. Plant proposes stewardship as an alternative to the ownership attitude that he believes permeates AFIT's functional areas.

> Individuals must learn that their actions affect the operation of the organisation, and that information can be made more usable and valuable by creating an open environment, where everyone gets the information they need to do their jobs. (Plant, 1996:61)

Factors Influencing Information Sharing

One cannot examine information ownership and stewardship attitudes without addressing the primary discriminator between the factors—one's attitude toward sharing information. While a willingness to share is necessary, it is not sufficient to ensure an exchange takes place. Several factors influence the information sharing process; descriptions of each influence follow.

Organizational Norms. Organizational norms represent the organization's power to endorse or hinder information sharing; the factor acts as a gatekeeper. An organization amenable to sharing is characterized by an open culture; its policies, procedures, and internal politics encourage sharing. On the other hand, a unit that hinders openness will display evidence of procedures with the opposite effect. An organization can discourage sharing by putting administrative barriers in place; these actions bridle the stewardship attitudes of employees.

However, the effect created by placing impediments to sharing will also occur if the company fails to enact IRM measures. In fact, a "lack of senior management support for the information resource makes an organisational view of information as a resource very difficult and will undermine the objectives of [information] management" (Plant, 1996:51).

Likewise, resistance that thwarts data integration efforts, which ultimately hinders information exchange between IS, can occur if a shift in the internal power structure is imminent. Placing every functional unit on an equal footing, with respect to an organizational view of data, disintegrates the power base derived from maintaining individualized databases (Goodhue and others, 1992:307). In fact, one of the three theories of resistance to new technology states that "systems that alter the balance of power in organizations will be resisted by those who lose power and accepted by those who gain it...." (Markus, 1983:431). The detrimental effect of the power and politics associated with information ownership is painfully obvious in the following case study.

> After FIS [Financial Information System] ... the divisional accountants still had to enter data, but they no longer "owned" it.... Corporate accountants designed and used FIS to create a substantial change in the distribution of, or access to, financial data, a valued resource. It is not surprising that those who gained access (corporate accountants) were pleased with the system and that those who lost control (divisional accountants) resisted it by writing angry memos, maintaining parallel systems, engaging in behavior that jeopardized the integrity of the database, and participating in a task force with the public objective of eliminating FIS.... (Markus, 1983:438)

A corporation culture that encourages information sharing is more likely to witness that behavior in its employees. Likewise, a company's culture that discourages sharing, either through overt actions or a lack of support, will inhibit the exchange of information. Yet, no culture can guarantee its desired intent; the policies and procedures must be internalized to be completely effective (Constant and others, 1994:400). Constant and others also introduce the belief of prosocial transformations; this characteristic assumes individuals desire rewarding benefits, not only for themselves but for the good of the organization as well (Constant and others, 1994:403).

Information Structure. The information structure ensures information desired by the requester is, indeed, the same information that is provided.

> For example, a question that seems as clear as "How many students are assigned to AFIT?" might get a range of answers from 400 to 4,000 depending on exactly what one means by assigned to AFIT. The problem is compounded by asking for more specific information which requires further interpretation, such as specifying a year. For example, does the requester mean fiscal year, calendar year, or academic year? Asking three different offices the "same" question can lead to three different answers because the question may not, in fact, mean precisely the same thing to each of those offices. (Heminger and others, 1996:14-15)

Certainly participants in sharing must agree on the information being exchanged. This consensus is necessary not only in conversations, but in business transactions as well. "A common language for communicating ... business events is a prerequisite for coordinating diverse and far-flung units of organizations" (Goodhue and others, 1992:293).

The information structure's complexity can range between a simple agreement between two parties to complicated data definitions and usage procedures for elements in a database. Achieving commonality across IS requires "standardization of data definitions and structures through the use of a common conceptual schema" (Goodhue and others, 1992:294). Problems with the lack of compatible data exist in many large organizations.

> Within a single company there are often different identifiers for key business entities, such as customer or product, different schemes for aggregating key indicators such as sales or expenses, or different ways of calculating key concepts, such as profit or return on investments. (Goodhue and others, 1992:293)

The absence of data integration across IS results in an inability to answer cross-functional questions, take advantage of business opportunities, or solve the company's problems. Defining an organization's data elements in a common form provides the "ability to easily share information between applications ... using elements defined in a common data dictionary" (Plant, 1996:52).

- Information Channel. Whereas the information structure provides a common basis from a conceptual viewpoint, information channel represents the physical

dimension. "An information channel is any medium by which a message may be transmitted from a source to a receiver" (Swanson, 1987:131). The importance of the medium that carries the message, however, has been subject to question. Swanson's case study of management reports showed "information use can be explained in part by channel disposition" (1987:143). However, Allen's investigation of the flow of scientific information in a laboratory setting reached the opposite conclusion. Allen's work supported less of a distinction between information channels and a higher emphasis regarding accessibility (Allen, 1977:41; Swanson, 1987:143).

Even if the source of information is not physically available, the incorporation of IS allow information sharing within organizations. Whereas in the past, information was issued using methods that required physical proximity and social acquaintance (Sproull and Kiesler, 1991:121), today the availability of networks, file servers, computerized bulletin boards, Intranets, Extranets, and the Internet, allow rapid, widespread distribution of information.

However, an unfortunately common occurrence in today's business environment is one where an individual desires to extract information from a database but is unable to because of hardware or software compatibility problems. This example highlights the role of the information channel in communicating the message or the exchange of information. In this case, a deficiency exists in the channel between the requester and where the information is stored. AFIT, like many other organizations, suffers from poor integration of its IS.

> The current systems [at AFIT] are diverse and poorly integrated. Efforts to better integrate the systems have been incomplete and therefore, often unsuccessful. The result is that AFIT has a variety of disparate information systems, some of which do not "talk" to each other, and others of which are hard to use. (Heminger and others, 1996:15)

Agent. The last factor that contributes to whether or not information sharing occurs is people. Individuals often control the flow of information they possess; in other words, agents, like organizational norms, act as gatekeepers.

Plant's supposition of an ownership attitude was based on his observations of AFIT's poor IRM practices (Plant, 1996:59; Heminger and others, 1996:14-16). Yet, in order to confirm an ownership attitude exists, we must be able to make a distinction between an ownership attitude and a stewardship one. However, because an attitude is a latent construct and cannot be measured directly, we must define which beliefs influence it (Fishbein and Ajzen, 1975:8).

Attitudes and Beliefs

Fishbein and Ajzen propose a model that defines this relationship—linking beliefs, attitudes, intentions, and behaviors. Beliefs about an object's characteristics determine one's overall attitude as to that object. The individual's attitude, in turn, guides his or her intentions. Subsequently, intentions influence one's behavior regarding the subject (Fishbein and Ajzen, 1975:15). Therefore, how we behave with respect to a given subject, is linked to our beliefs about the subject's characteristics. This conceptual framework is presented in Figure 2.

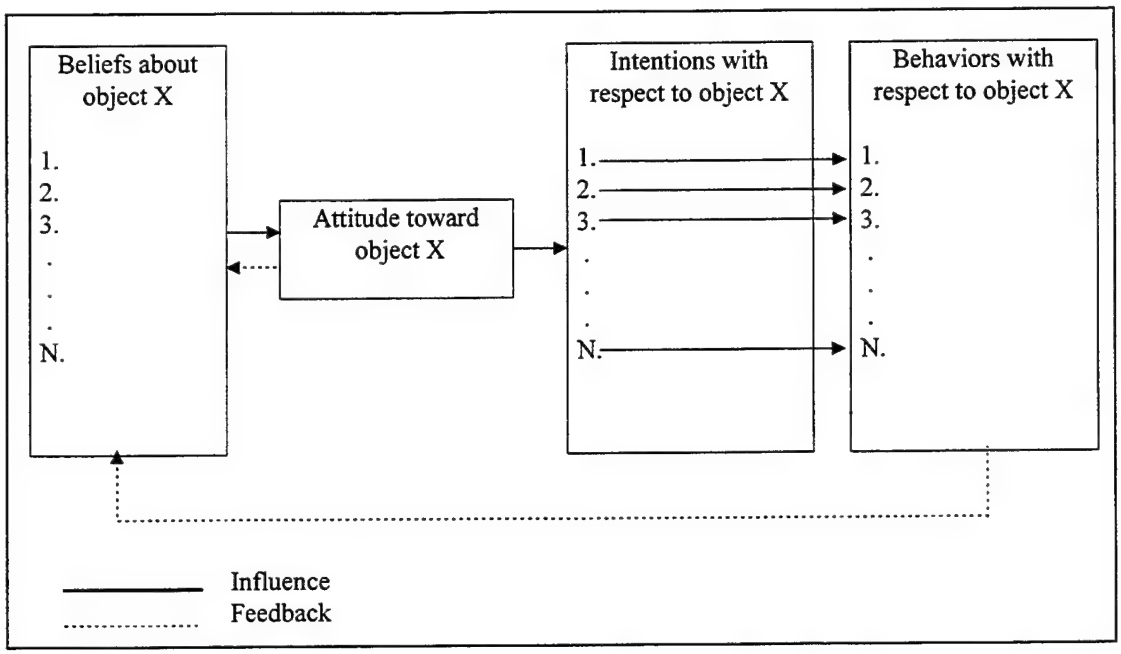

Figure 2. Conceptual Framework Relating Beliefs, Attitudes, Intentions, and Behaviors (Fishbein and Ajzen, 1975:15)

Goodhue's research details numerous studies that examined individuals' attitudes regarding IS and the beliefs that influence them (1988:6). The survey Goodhue used to develop his model of IS satisfactoriness focuses on the respondents' beliefs *not* attitudes. "We should ask the respondent of a questionnaire to report his beliefs, as an expert witness, on the objective correspondence between his task and the system he has access to, rather than eliciting attitudes or feelings about the system or its use" (Goodhue, 1988:13). This beliefs-determine-attitudes approach supports Fishbein and Ajzen's model.

Attitudes that Define Information. Prior to examining dimensions affecting information sharing, a consensus on the definition of information is desired. Unfortunately, finding such an agreement is a difficult task. Straub notes that "constructs

like 'information' and 'information value' are still in need of validation and further refinement" (1989:162). Because a concrete definition could not be established, Swanson investigated several authors' efforts to define information's attribute space. He discovered a plethora of attributes associated with the entity. Five textbooks listed a total of 40 attributes; only one—accuracy—made all five lists. The following terms made more than one list: frequency, timeliness, redundancy, cost, currency, format, horizon, precision, and relevance. In an effort to bring "closure" to information's definition, Swanson offers two methods to unify these 40 attributes. The first method builds upon a set of concepts and assumptions; the second method tests a model using empirical data. Unfortunately, neither method is without its critics (Swanson, 1985-1986:89-90).

Information was not defined *per se* on this study's survey instrument. Rather, it was left to the respondent to interpret the entity based on the following set of restrictions: the information did not to need any special treatment (e.g., classification, special handling because of sensitive data) and the recipient of the information had an authorization and a requirement to use it.

Many beliefs have been examined as possible determinants to individuals' attitudes regarding information or information sharing. This study's instrument was built using constructs examined in previous research; Figure 3 lists the constructs used. The factors include beliefs regarding information (e.g., type, amount, and value), interpersonal relations (e.g., acceptance of others, self-interest, and reciprocity), organizational factors (e.g., prosocial transformations and organizational norms), and task dependency. Research concerning each belief is discussed.

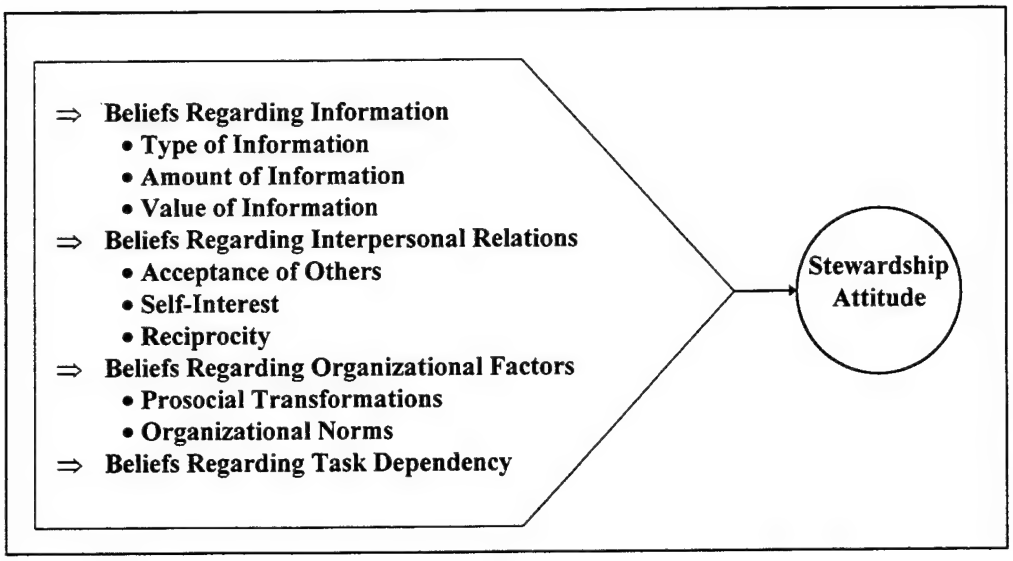

Figure 3. Beliefs Used to Define Stewardship Attitude

Beliefs Regarding Information. Zmud's empirical investigation to determine the dimensionality of information revealed four separate groupings. Because these classes of dimensions pertain to information, they were considered possible determinants to information sharing as well. A list of these classes follows:

- An overall view of the quality of information consisting of a measure of relevancy
- The accepted constituent parts of relevancy
- A measure of the quality of presentation consisting of both the arrangement and readability of the information
- A view of the quality of meaning provided by the information as represented by its reasonableness (Zmud, 1978:192)

Additional support for dimensions regarding the type of information is available. In his examination regarding the "extent to which decision makers would select ... sources for use in decision making," O'Reilly noted differences in the type of information requested (1982:767). His study showed files (handbooks and procedures) and internal

group communications were preferred more than either updates (memos and newsletters) or external sources (others outside the unit and in other organizations). In addition, in certain situations oral communication is preferred to written communication (O'Reilly, 1982:768). Constant and others also discovered a link between the type of information and the attitude about sharing it. One of the results of their experiments was that "the relationship between perceptions of organizational ownership and attitudes about sharing differ[s] with the type of information" (Constant and others, 1994: 415). Employees are more likely to share personal knowledge (e.g., computer expertise) than tangible information (e.g., computer program) (Constant and others, 1994:400).

Laughlin and others performed a series of experiments examining a theory of collective induction. One of the treatments they used in the study was the amount of potential information available. Their research indicated increased amounts of information benefited the face-to-face and computer-mediated groups (Laughlin and others, 1995:110).

The value managers place on information was examined. Managers, from different functional areas and different hierarchical levels, showed no significant difference in the value they placed on the information they used (Epstein and King, 1982:252).

Beliefs Regarding Interpersonal Relations. In addition to factors involving the information itself, interpersonal relations often influence information sharing. Acceptance of others, manifest as the strength of ties between the sender and the receiver,

was examined by Weenig and Midden (1991:734). Two dimensions were reviewed: the availability and strength of the ties. While informational diffusion relied on only the availability of ties, adoption decisions (requiring information sharing) needed stronger bonds between the sender and the receiver (Weenig and Midden, 1991:739). Friendships and personal contacts heavily influence communication between individuals; thus, the likelihood of information sharing is increased (Constant and others, 1994:401).

Self-interest and reciprocity also play roles in information sharing. Both variables exert a negative influence on sharing (assuming negative reciprocity). However, this negative impact can be overcome by mediators such as prosocial attitudes and positive organizational norms (Constant and others, 1994:406).

The theory of interdependence explains major influences on how people interact with each other. Whenever an exchange takes place, each participant brings to the table his or her set of beliefs; these, in turn, interact with those belonging to the other party. A consensus is then reached based on this resultant interaction. The interdependence theory identifies the abilities, needs, and evaluative criteria each participant uses to develop his or her decision (Kelley and Thibaut, 1978:3). Because the process of sharing information usually results from interactions between two or more individuals, the theory is easily mapped to the sharing process.

Constant and others used the interdependency theory to define the context of sharing information. They distinguish "exchange between two individuals acting alone and exchange between two individuals who are influenced by their social and organizational context" (Constant and others, 1994:401-402). When individuals are not

influenced by external factors, self-interest and simple reciprocity play a dominant role in behaviors: "I help you if you help me; I withhold help if you act destructively" (Constant and others, 1994:402). If the individual's goal (with respect to outcome of sharing) is relatively more important than executing revenge, then he or she will share. If on the other hand, the personal benefit is less important, he or she will deliberately prohibit sharing.

Beliefs Regarding Organizational Factors. The organizational environment (e.g., policies, procedures, and culture) also influences the sharing process (Constant and others, 1994:402-404). Even if negative reciprocity is involved in an information exchange, sharing may still occur if the provider believes the information benefits the organization. This prosocial transformation is further described by O'Reilly and Chatman with respect to one's psychological attachment to the organization (1986:492). Their research examined the underlying dimensions of organizational commitment and its subsequent impact on prosocial behavior and turnover. Brief and Motowidlo's thorough review of prosocial organizational behaviors identifies organizational commitment, citizenship behavior, and whistle-blowing as prosocial behaviors. Of these, citizenship (synonymous with prosocial transformations) is most closely associated with sharing information. One aspect of organizational citizenship is performing activities for the sake of the organization rather than for the benefit of the individual (Brief and Motowidlo, 1986:714).

Beliefs Regarding Task Dependency. Zmud, in his work examining the dimensionality of information, derives four constructs relating to information. One of these dimensions, relevancy (synonymous with task dependency), determines whether or not the requested information is related to the task. The components of relevancy are as follows: accurate (accurate, believable), factual (factual, true), quantity (complete, effective, material, sufficient), and reliable/timely (current, reliable, timely, valid) (Zmud, 1978:191).

Summary

This study's instrument incorporated several attributes regarding information. These attributes, as well as determinants of the sharing process, were examined.

III. Methodology

Overview

This chapter walks the reader through the process of establishing an appropriate survey instrument for the study. Details concerning the selection of the sample as well as the distribution of the instrument are discussed.

Development of the Survey Instrument

Research Design. A survey research methodology was selected to quantify individuals' attitudes regarding information ownership and stewardship. The examination of individuals' attitudes at AFIT matched the survey research criteria established by Pinsonneault and Kraemer:

> - The central questions of interest about the phenomena are "what is happening?" and "how and why is it happening?" Survey research is especially well suited for answering questions about what, how much, and how many, and to a greater extent than is commonly understood, questions about how and why. (Pinsonneault and Kraemer, 1993:78)

Plant suggested that an attitude of information ownership existed in the functional areas of AFIT. If this proposition is true, individuals who work in those areas should have a corresponding attitude of information ownership. This study will examine whether or not differing attitudes regarding information ownership and stewardship appear at the individual level. If opposing attitudes do exist, this study's results will seek to determine whether the majority opinion is, indeed, one of information ownership.

- Control of the independent and dependent variables is not possible or desirable.

Because examination of cause and effect relationships was not part of the study's initial design, independent and dependent variables were not hypothesized.

- The phenomena of interest must be studied in their natural setting.

Although individuals' attitudes may change based on life experiences and different job environments, the attitudes of interest are those of the individuals who work at AFIT. As such, the environment must be maintained in order for the attitudes to be consistent.

- The phenomena of interest occur in current time or the recent past.

The study's measure of individuals' attitudes focuses on their attitudes while they were employed at AFIT. The survey participants—current employees—provide the clearest picture of individual attitudes at AFIT.

Survey Type. The purpose of this survey research was description as opposed to explanation or exploration. The descriptive approach was selected to "find out what situations, events, attitudes, or opinions are occurring in a population" (Pinsonneault and Kraemer, 1993:80). A cross-sectional study was designed to confirm Plant's assertion that an "attitude of ownership of information as determined from the behaviors exhibited" exists within AFIT (Plant, 1996:59).

Survey Instrument. A new instrument was developed because an established one could not be found which adequately measured the proposed construct in this research

stream. The characteristics of information ownership and stewardship discussed in the previous chapter were used to build the 20 scales. The characteristics include: type of information, amount of information, value of information, acceptance of others, self-interest, reciprocity, prosocial transformation, organizational norms, and task dependency. Two questions were written for each characteristic. Approximately half of the questions were reverse scored. Item 5 and item 9 were aggregate measures of all the characteristics.

The questions' structure was a modified semantic differential (DeVellis, 1991:70-71). A bipolar, descriptive statement was placed at each end of the continuum; the extreme views were selected to represent typical information ownership and stewardship attitudes. The response for each item consists of one value ranging from one to seven; non-integer responses were rounded to the nearest number.

Two questions (items 21 and 22) captured the individual's self-reported attitudes regarding information ownership and stewardship; only binary responses were allowed for these items. These questions were prefaced with definitions of each term. The definition of an information owner was gleaned from Weldon's research (1986:54); while, the definition of an information steward is a paraphrase of English's work (1993:54). A small amount of demographic information was asked; in addition, space for written comments was provided.

Pretest of Surveys. Because the survey instrument was not established in previous research, the questionnaires were pretested. Nine AFIT students and one civilian

employee completed the pretest. Students were used to avoid exhausting the limited sample frame. After competing the survey, the pretest participants were interviewed in an effort to bolster the instrument's content validity. To minimize measurement error, participants were asked to reveal problems with the instrument's readability and to ferret out confusing or ambiguous questions. Each instrument version included suggestions made by the participants up to that point. The final survey instrument is presented in Appendix A.

Sampling Procedures

Units of Analysis. An organization is defined as a "group of people working together in a structured and coordinated fashion to achieve a set of goals" (Griffin,1996:4). Yet, individuals are the indispensable ingredients that define organizational cultures. Therefore, this study's unit of analysis is the individual.

Respondents. The intent of this study is to discover the underlying attitudes of information ownership within AFIT. Although the unit of analysis is the individual employee, every attempt was made to present a cross-section of the organization itself. Therefore, multiple respondents from multiple groups within the unit were polled. All of AFIT's identified functional areas (Plant, 1996:40) were sampled. The student body was excluded because it has little, if any, impact on operational information issues or altering the unit's structural organization. Figure 4 details AFIT's structural makeup.

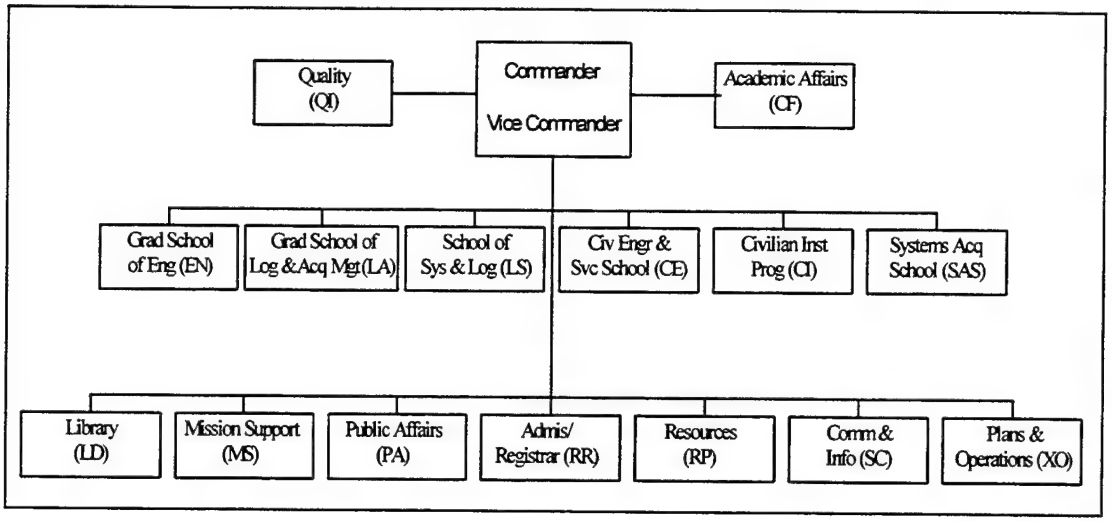

Figure 4. AFIT Organization Structure
(Walter, 1997)

The target population was AFIT's faculty and administrative and support personnel. The exact size of the population is, unfortunately, an elusive number. For example, the Resources directorate briefs that 521 employees are assigned to the unit (Walter, 1997); while, addresses on the electronic mail (email) distribution lists number only 495. Several reasons account for this ambiguity. One reason for the organization's constantly changing membership is the dynamic nature of the military's assignment system; military members transfer into and out of AFIT approximately every three years. Although civilian reassignments are not as frequent, they do occur. The findings in Air Force Institute of Technology: Analysis of Information Need and Technology highlight another reason for the imprecise count. AFIT suffers from multiple sources of redundant, inconsistent information about the number of faculty and staff employed. This inconsistent information is often fragmented into isolated work areas and stored by

disparate means (Heminger and others, 1996:14-15). For these reasons, accurately the population's size is impracticable.

Representativeness of the Sample Frame. AFIT's email address book lists were used as the sample frame. Given the difficulties presented above, the lists may not be a strict one-to-one listing of the population in question. Therefore, the lists were screened to ensure more than one survey was not sent to the same person. Although the lists' imperfect mapping of the population may introduce a confounding issue in the analysis, they were considered to be the best possible sample frame available.

The lists included Department of the Air Force civilians, military, and contractor support personnel from the organization's functional areas. The lists are maintained by individuals within the functional areas and are continually changing; each list was accessed one day prior to the distribution of the survey.

Representativeness of the Sample. The sample comprises a cross-section of AFIT's population. The following procedure was followed to randomize the sample. Potential participants in the survey were determined by selecting every other name from the sample frame starting with the first name on the list. Several names were deleted from the distribution lists because obvious errors regarding the individuals' location were detected.

Selection of Sample Size. The size of the sample directly reflects a study's precision. Pinsonneault and Kraemer remark, "The gains in precision increase considerably with samples between 100 and 200...." (1993:92). Considering the

confounding factors introduced by email and AFIT's relatively small target population, an effort was made to capture at least the lower end of the acceptability range (100). A 40 percent response rate was expected from the survey's distribution. This response rate is based on completely accurate address lists. The survey was emailed to 249 of the 495 individuals on the distribution lists.

Distribution of the Survey Instrument

In an effort to boost the historically low response rate observed from mail questionnaires (Pinsonneault and Kraemer, 1993:95), the aforementioned survey was emailed to individuals listed on the distribution lists. Electronically mailing the survey was expected to provide an expeditious method of obtaining the sample data. Pinsonneault and Kraemer remark that computer-imbedded questionnaires are rarely used—a fact that contradicts the expectations from technology savvy information resource users (1993:94). The survey was written in Microsoft Word for Windows 95® (Version 7.0a) and was attached to an email message sent to prospective respondents identified from the address book lists. The message explained the instrument's purpose and presented a suspense date for the completion of survey. Survey data were gathered over a two-week period; the raw data is presented in Appendix B. Individuals who experienced difficulty opening the attached file or required additional information were asked to contact the author. Respondents using incompatible email programs were provided a printed copy of the survey when requested.

Responses could be returned in one of three ways. First, the surveys could be completed using a compatible word processing program, then returned using email. Second, the survey could be printed, completed, then faxed to a phone number provided. Third, the survey could be printed, completed, then returned using the organization's internal distribution system. Even though these methods do not guarantee complete anonymity (e.g., a return email address is listed on email responses), every effort was made to guarantee anonymity; identifying headers were removed from the returned surveys.

Summary

This chapter focused on the methodology used to answer the study's questions. The survey was selected as an appropriate way to obtain data for this study. The participants are diverse enough to provide a sufficient representation of the overall population. The collected data will be analyzed to determine individuals' attitudes regarding their responsibilities with information.

IV. Results and Analysis

Overview

This chapter reports the results from the distribution of the survey instrument. The initial results were inconclusive; therefore, the data were subjected to an exploratory factor analysis that identified three groupings. The factors, as well as the relationships between them, were examined. These results were analyzed with respect to the research questions and propositions made earlier.

Response Rate

Responses were received from all 13 functional areas; five individuals did not identify their office symbol. Eighty-six responses were received; all were considered except one that was received well into the analysis period. Table 1 details the response rate information.

Table 1. Response Rate Statistics

Functional Area	Number in Population	Number Sampled		Number of Return Receipts	
CC	8	4	50.00%	1	25.00%
CI	24	12	50.00%	3	25.00%
LS	110	55	50.00%	14	25.45%
LA	38	20	52.63%	11	55.00%
XO	9	4	44.44%	2	50.00%
RR	28	14	50.00%	6	42.86%
LD	13	7	53.85%	4	57.14%
MS	14	7	50.00%	3	42.86%
RP	15	8	53.33%	3	37.50%
PA	2	1	50.00%	1	100.00%
CE	22	11	50.00%	1	9.09%
EN	162	81	50.00%	20	24.69%
SC	49	25	51.02%	11	44.00%
Unknown	-	-	-	5	-
Totals	**494**	**249**	**50.40%**	**85**	**34.14%**

The response rate of 34.14% is below the minimum of 51% that is considered acceptable for social sciences (Pinsonneault and Kraemer, 1993:94). Except for the Civil Engineer and Services School (CE), all the sub-areas had a response rate of at least 24.69%. CE's response was 9.09% There is no evidence to suggest CE's responses would not fall within the normal range or that this aberration was generated by an external event (e.g., failure of the email system). Therefore, CE's anemic response is considered a random event.

Validating the Survey Instrument

Construct Validity. Construct validity asks "whether the measures chosen are true constructs describing the event or merely artifacts of the methodology itself." In other words, "are the measures drawn from all possible measures of the properties under investigation" (Straub, 1989:150)? The survey was written to measure the respondent's attitude of information ownership and stewardship by examining their beliefs about the ten characteristics discussed in chapter II. Two questions were written to measure each belief. Initial efforts to confirm construct validity between the paired questions failed. The ten correlations are listed in Table 2. Although nine of the ten were positive at the 0.05 level of significance, only three cleared the 0.60 level of acceptability. Obviously, what was measured was *not* what was expected to be measured.

Table 2. Results of Initial Content Validity Analysis

Beliefs About ...	Questions	Cronbach Alpha	Validity Rating
Type of Information	i3r and i18	.46	Poor
Amount of Information	i1r and i13r	.75	Good
Value of Information	i14 and i17r	.43	Poor
Acceptance of Others	i2 and i20r	.43	Poor
Self-Interest	i7 and i16r	-.27	Poor
Reciprocity	i10 and i15r	.82	Good
Prosocial Transformations	i12 and i19r	.52	Poor
Organizational Norms	i6 and i11r	.00	Poor
Task Dependency	i4r and i8	.68	Good
Attitude about Information Ownership and Stewardship	i5 and i9r	.58	Marginal

An exploratory factor analysis was then applied, using SAS, in an effort to determine the number of latent variables—condensing the original list of ten. Further

analysis would "define the substantive content or meaning of the factors (i.e., latent variables) that account for the variation among a larger set of items" (DeVellis, 1991:92).

The factor analysis methodology was used to determine which of the primary factors to retain. The explanatory utility of secondary factors was assumed to be nil. Therefore, retaining additional factors would not increase understanding the proposed model (DeVellis, 1991:96). Eigenvalues were analyzed to "retain only [those] factors that explain more variance than the average amount explained by one of the original items" (DeVellis, 1991:97); factors with eigenvalues greater than one were maintained. As a confirmatory measure, scree plots were also examined in order to keep "the factors that contribute [the] most to the explanation of variance in the total set of original items" (DeVellis, 1991:98). Based on the analysis, three factors were retained.

To simplify the structure, a varimax rotation—maximizing the variance of the squared loadings—was performed to improve the fit between items and factors. The analysis converged after four iterations. DeVellis, however, warns about reading too much importance into calculated factors.

> It is important to recognize that factor analysis tells us about the latent variables underlying our *set of items*. [It merely describes] the empirical relationships ... among a specific set of items; that is, it speaks to the *operationalization* of the construct but not necessarily to the construct itself. (DeVellis, 1991:107)

A factor loading of 0.39 was used to determine the factors that loaded with significant strength; six items were eliminated from consideration. Items i3r, i7, and i11r failed to load strongly on any of the three factors, while items i12 and i18 loaded only weakly. Item i9r was removed because it continuously loaded strongly on two factors.

The initial factor analysis is detailed in Table 3; the results of the final exploratory factor analysis are listed in Table 4.

Table 3. Results of Initial Factor Analysis

	Factor A	Factor B	Factor C
i1r	.54	.47	.21
i2	.36	.41	-.45
i3r	.22	.27	-.01
i4r	.58	.23	-.03
i5	.47	.40	-.41
i6	.49	.50	-.32
i7	-.22	-.01	-.01
i8	.61	.29	-.14
i9r	.60	.34	.03
i10	.80	-.51	-.02
i11r	.02	.04	.03
i12	.37	.45	-.02
i13r	.42	.43	.47
i14	.54	.19	-.14
i15r	.60	-.40	.11
i16r	.51	.13	.24
i17r	.34	.12	.31
i18	.42	.22	.12
i19r	.48	.35	.24
i20r	.35	.55	.24

Table 4. Results of Final Factor Analysis

	Factor A	Factor B	Factor C
i5	.74	.14	.06
i6	.73	.26	.00
i2	.69	.07	-.02
i8	.53	.31	.27
i14	.46	.21	.28
i4r	.44	.36	.27
i13r	.10	.79	.04
i1r	.37	.67	.09
i20r	.28	.60	-.09
i19r	.25	.58	.14
i16r	.15	.43	.32
i17r	.03	.39	.21
i10	.15	.06	.90
i15r	.02	.12	.73

Reliability. Reliability tests measure the degree to which the survey is free from measurement error. Large Cronbach alphas—greater than 0.80— are the common tests for reliability (Straub, 1989:150; Baroudi and Orlikowski, 1988:50). The tests demonstrated that the measure is reasonably internally consistent; the Cronbach alphas were all centered on the 0.80 floor. The reliability scores are captured in Table 5.

Table 5. Reliability Scores

	Cronbach's Alpha
Factor A	.80
Factor B	.78
Factor C	.82

Survey Results

Approximately 76% of the respondents considered themselves information stewards; 52% stated their coworkers behaved as information stewards. In addition, the responses revealed a wide range exists in the number of years individuals have been assigned at AFIT—from a few months to a high of 42 years. The average respondent has been working at AFIT for 6.52 years. Less than half (43%) of the respondents reported being responsible for procuring or maintaining a computerized information system. Half of the people considered their knowledge of computerized information systems as slightly less than average.

As discussed earlier, several items were eliminated from consideration. The mean scores and standard deviations for the remaining questions are listed in Table 6.

Table 6. Mean Scores for Retained Items

Item Description	Mean Score	Standard Deviation
Share with respect to size	2.97	1.40
Tendency to share	5.41	1.34
Responsibility for information	4.34	1.59
Should be shared	5.20	1.43
Organizational culture	5.82	1.35
Tend to make available	5.11	1.53
Treatment by requester	3.84	1.70
Share with respect to amount	3.62	1.70
Share with respect to worth	4.56	1.91
Treatment by requester	3.84	1.74
Symbol of power	2.35	1.39
Value affects sharing	3.30	1.71
Who information benefits	2.75	1.32
Question information requests	3.59	1.80
Self-report stewardship	75.68%	0.43
Stewardship of coworkers	52.05%	0.50
Years at AFIT	6.84	8.16
Not Responsible for IS	43.42%	0.50
Knowledge of IS	2.87	0.98

Factor Loadings

The individual items that comprise each factor grouping were examined to "provide a clue as to what were the underlying latent variables represented by the factors" (DeVellis, 1991:93). The factor loadings yielded strong, unambiguous groupings; results are presented in Table 4. Frequency histograms are presented for each factor. In addition, because all three distributions are somewhat bell-shaped, a Normal probability plot was

drawn. This figure allows comparison between the factor's distribution and the Normal curve.

Factor A—Stewardship Attitude. The following concepts were contained in items that loaded on Factor A:

- Tendency to share
- Responsibility for information
- Should be shared
- Organizational culture
- Tend to make available
- Share with respect to worth

Analysis of these items reveals elements common to a stewardship attitude. As discussed in chapter II, an individual with a stewardship attitude is more likely to share information—regardless of external circumstances that would otherwise limit this altruistic behavior. The steward truly views shared information as a resource that benefits the organization. The concepts that define Stewardship Attitude support English's (1993:54) and Plant's (1996:61) desire for employees to internalize the notions of managing information on behalf of the organization.

The distribution of the Stewardship Attitude factor is negatively skewed and bell-shaped. The factor has a mean of 5.07 and a standard deviation of 1.10. The factor's frequency distribution is presented in Figure 5. Bins are numbered such that bin number seven contains the observations greater than six and less than or equal to seven. The factor's Normal probability plot is shown in Appendix C, Figure 16.

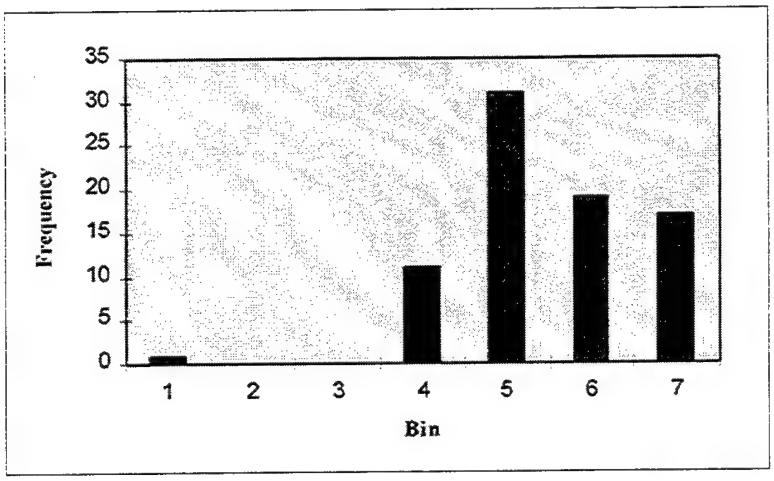

Figure 5. Stewardship Attitude Histogram

Factor B—Instrumentality. Items that loaded in Factor B contained the following notions:

- Share with respect to size
- Share with respect to amount
- Symbol of power
- Value affects sharing
- Whom information benefits
- Question information requests

This multidimensional factor contains elements regarding the context of the information itself, as well as the implications of sharing it. In other words, the characteristics describe the information's instrumentality. The dimensions that reflect physical measures of the information (e.g., size, amount, and value) support the research by Epstein and King (1982:252), O'Reilly (1982:767), and Laughlin and others (1995:110). The components discussing the impact of sharing (e.g., power and benefit) support the research by Kelly and Thibaut (1978:3), Weenig and Midden (1991:739), and Constant and others (1994:406).

Factor B's distribution is bell-shaped with a slight positive skewness. The distribution has a mean of 3.10 and a standard deviation of 1.08. The factor's frequency histogram is presented in Figure 6; the associated Normal probability plot is shown in Appendix C, Figure 17.

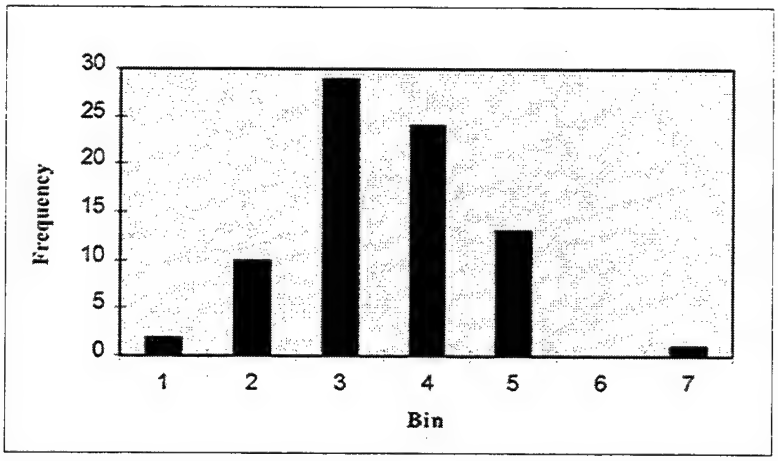

Figure 6. Instrumentality Histogram

Factor C—Value for Feelings. Two items loaded consistently on the third factor. These items shared the following element:

- Sharing with regard to treatment by the requester

This return-in-kind attitude reflects the human nature aspect of sharing. How the requester has treated you in the past, whether with kindness or with disdain, may determine whether or not a person is willing to share the information he or she possesses. The operationalization of the Value for Feelings factor was reciprocity. This factor strongly supports previous work by Constant and others (1994:402).

The Value for Feelings factor has a bell-shaped distribution with a mean score of 3.84 and a standard deviation of 1.57. The factor's histogram and Normal probability plot are presented in Figure 7 and Appendix C, Figure 18 respectively.

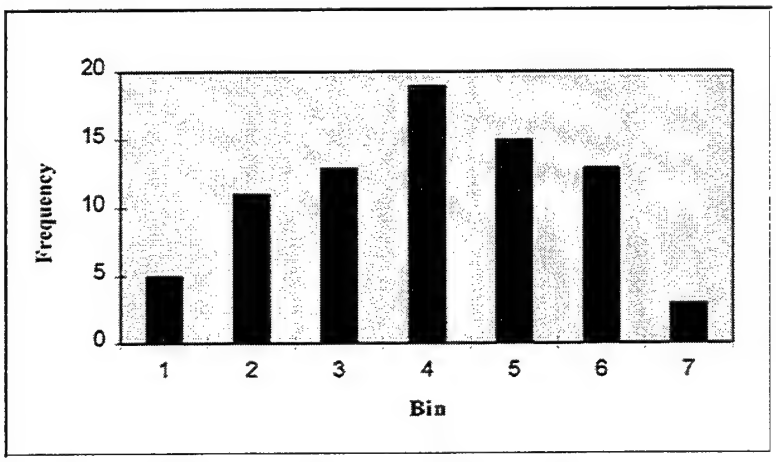

Figure 7. Value for Feelings Histogram

Relationship Between Factors

Simple linear regression and Analysis of Variance (ANOVA) studies were conducted to discover whether or not any interaction existed between the factors. First, ANOVA was performed to test whether or not the sample means were equal. Assumptions must be made to ensure validity of the test. The probability distributions for the factors must be normal. Wilk-Shapiro tests conducted on the factors confirm normality of the distributions at a 0.05 level of significance; the results are posted in Table 7. Homogeneity exists among the population's variance; standard deviations ranged from 1.32 to 1.91. The sample was drawn randomly and independently; the methodology used

to obtain the sample ensured compliance with this assumption (McClave and Benson, 1994:864).

Table 7. Approximate Wilk-Shapiro Results

Factor	Wilk-Shapiro
Stewardship Attitude	0.9589
Instrumentality	0.9775
Value for Feelings	0.9710

Second, heteroscedasticity will be examined. A residual plot of the error component will be reviewed to ensure error is truly random—no pattern exists in its distribution.

Third, a line of means will be fit to each scatter diagram. In order to "develop measures of reliability for the least square estimators and to develop hypothesis tests for examining the usefulness of the least squares line," assumptions regarding the distribution of the errors must be met (McClave and Benson, 1994:473). In this study, there is no reason to question that the error distributions are anything other than an independent, identically distributed Normal distributions with a mean of zero and a constant variance (McClave and Benson, 1994:472). The first factor listed in the heading is considered the dependent variable; this factor's ordinate is plotted parallel to the y-axis. The second factor is treated as the independent variable; this abscissa is plotted parallel to the x-axis.

The purpose of the analysis was to guide the development of the study's model, rather than to predict mean scores of the dependent variable with respect to an independent one. Each possible interaction between the factors will be examined in detail.

Stewardship Attitude and Instrumentality. ANOVA results show a negative correlation between Stewardship Attitude and Instrumentality. This correlation is significant at a 0.05 level of significance. Table 8 details the ANOVA and regression results.

Table 8. Regression and ANOVA Results for Stewardship Attitude and Instrumentality

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.53							
R Square	0.28							
Adjusted R Square	0.27							
Standard Error	0.94							
Observations	79.00							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1.00	26.83	26.83	30.24	0.00			
Residual	77.00	68.32	0.89					
Total	78.00	95.15						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	6.76	0.32	20.83	0.00	6.12	7.41	6.12	7.41
X Variable 1	-0.54	0.10	-5.50	0.00	-0.74	-0.35	-0.74	-0.35

Equation 1 summarizes the regression findings:

$$y = 6.76 - 0.54x \qquad (1)$$

The fitted line on the linear regression chart—Figure 8—confirms the negative correlation. No pattern is evident on the residual plot shown in Figure 9; therefore, the error coefficient is assumed to be random.

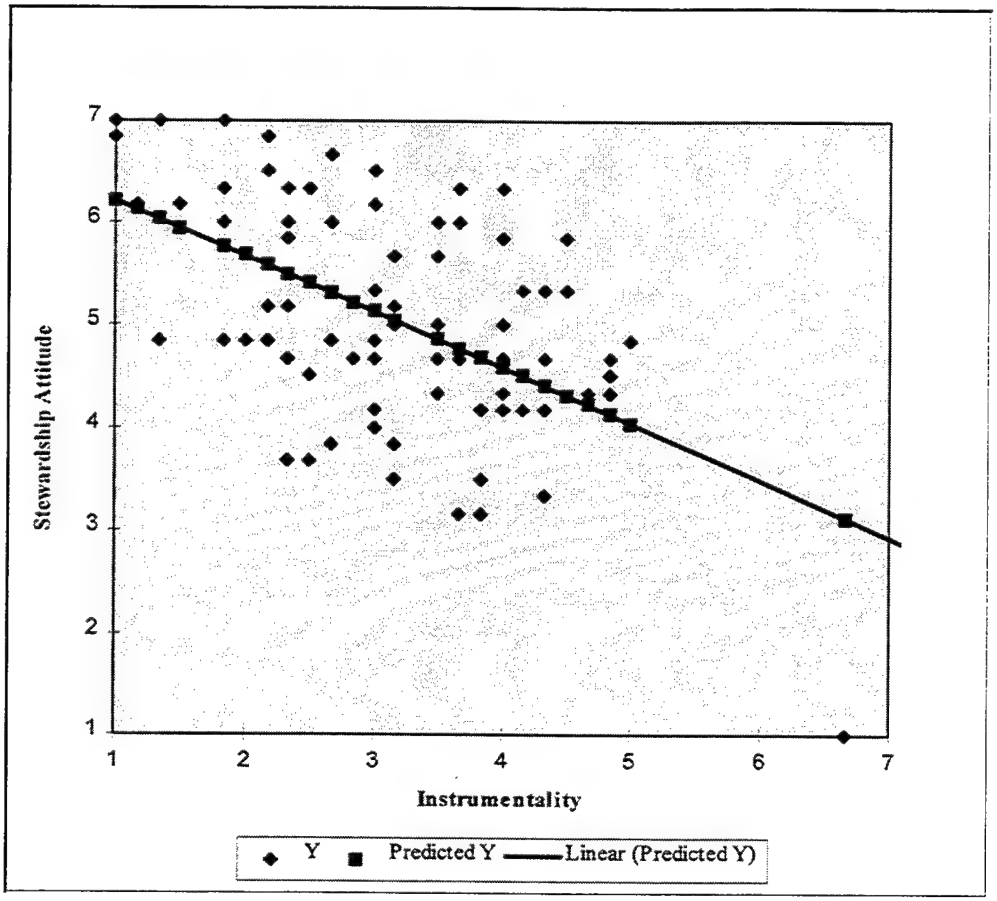

Figure 8. Stewardship Attitude and Instrumentality Line Fit Plot

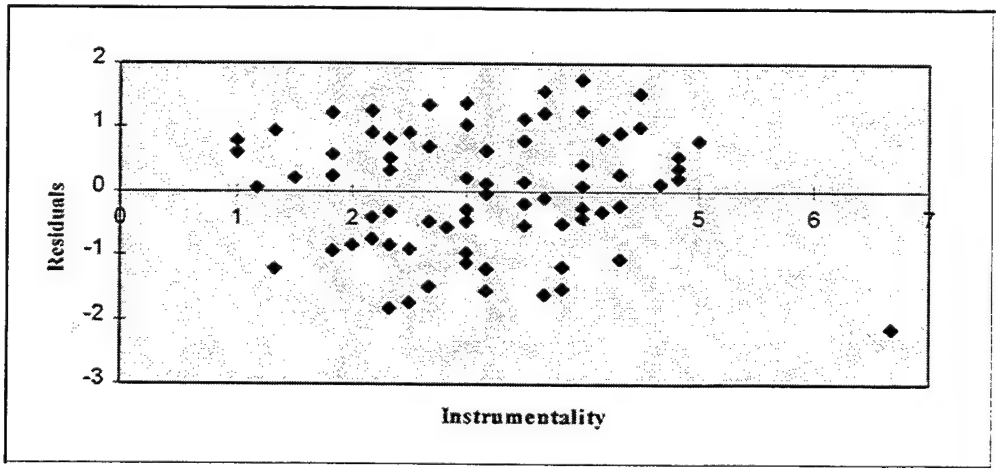

Figure 9. Stewardship Attitude and Instrumentality Residual Plot

Stewardship Attitude and Value for Feelings. ANOVA results describing the relationship between stewardship attitude and value for feelings reveal a slight negative correlation between the factors. Table 9 summarizes the ANOVA and regression results.

Table 9. Regression and ANOVA Results for Stewardship Attitude and Value for Feelings

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.28							
R Square	0.08							
Adjusted R Square	0.07							
Standard Error	1.07							
Observations	79.00							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1.00	7.52	7.52	6.60	0.01			
Residual	77.00	87.64	1.14					
Total	78.00	95.15						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	5.83	0.32	18.35	0.00	5.20	6.46	5.20	6.46
X Variable 1	-0.20	0.08	-2.57	0.01	-0.35	-0.04	-0.35	-0.04

Equation 2 summarizes the regression calculations.

$$y = 5.83 - 0.20x \qquad (2)$$

The line of means portrayed on the line fit plot, shown in Figure 10, confirms the slight negative correlation between the variables. Examination of the residual plot, displayed in Figure 11, shows a random pattern of the model's errors; therefore, no apparent bias exists.

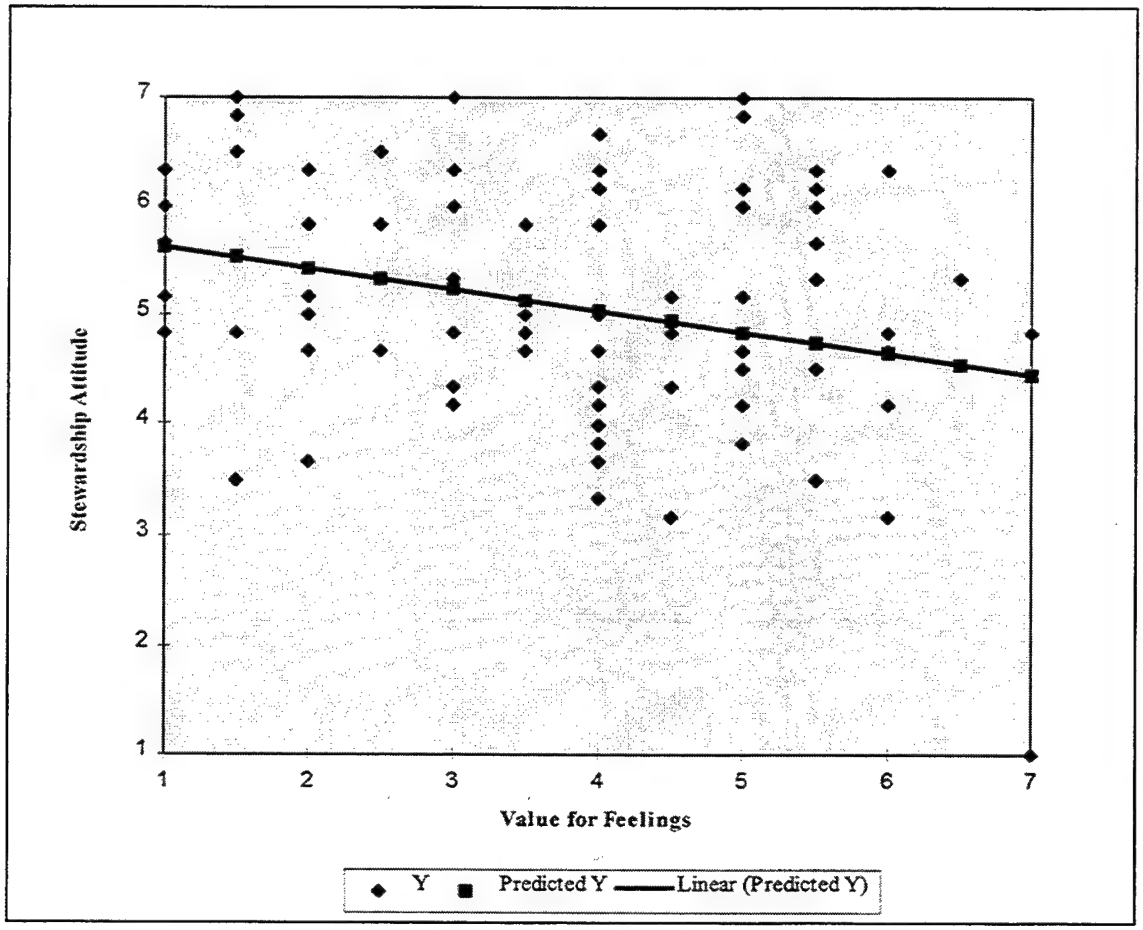

Figure 10. Stewardship Attitude and Value for Feelings Line Fit Plot

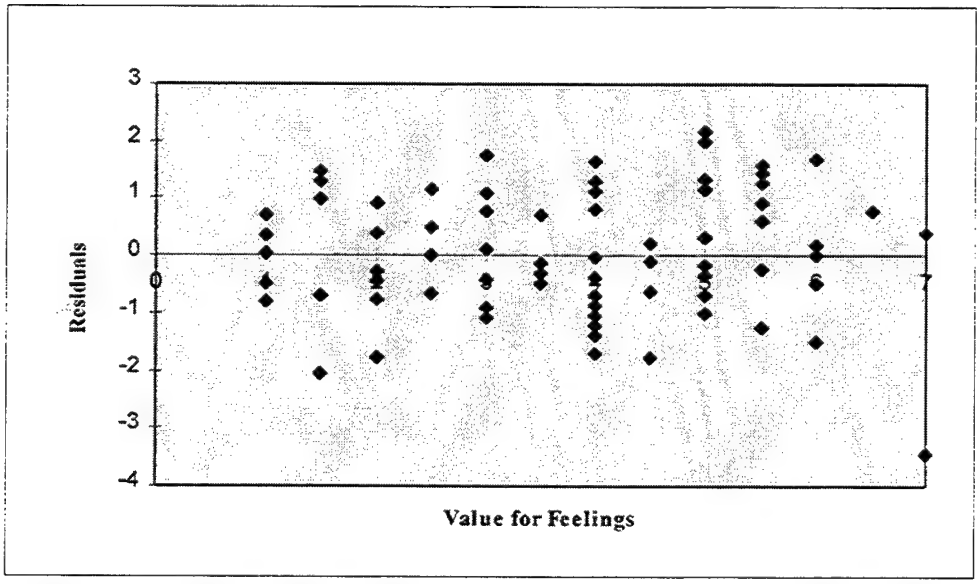

Figure 11. Stewardship Attitude and Value for Feelings Residual Plot

Instrumentality and Value for Feelings. Analysis of the relationship between Instrumentality and Value for Feelings reveals a slight positive correlation at the 0.05 level of significance. Table 10 shows the ANOVA and regression results.

Table 10. Regression and ANOVA Results for Instrumentality and Value for Feelings

SUMMARY OUTPUT)								
Regression Statistics								
Multiple R	0.26							
R Square	0.07							
Adjusted R Square	0.06							
Standard Error	1.05							
Observations	79.00							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1.00	6.17	6.17	5.64	0.02			
Residual	77.00	84.30	1.09					
Total	78.00	90.47						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	2.41	0.31	7.74	0.00	1.79	3.03	1.79	3.03
X Variable 1	0.18	0.08	2.37	0.02	0.03	0.33	0.03	0.33

Equation 3 summarizes the results.

$$y = 2.41 + 0.18x \qquad (3)$$

The line fit plot displayed in Figure 12 confirms the slight positive correlation between the variables. No apparent pattern in the residual plot is evident in Figure 13.

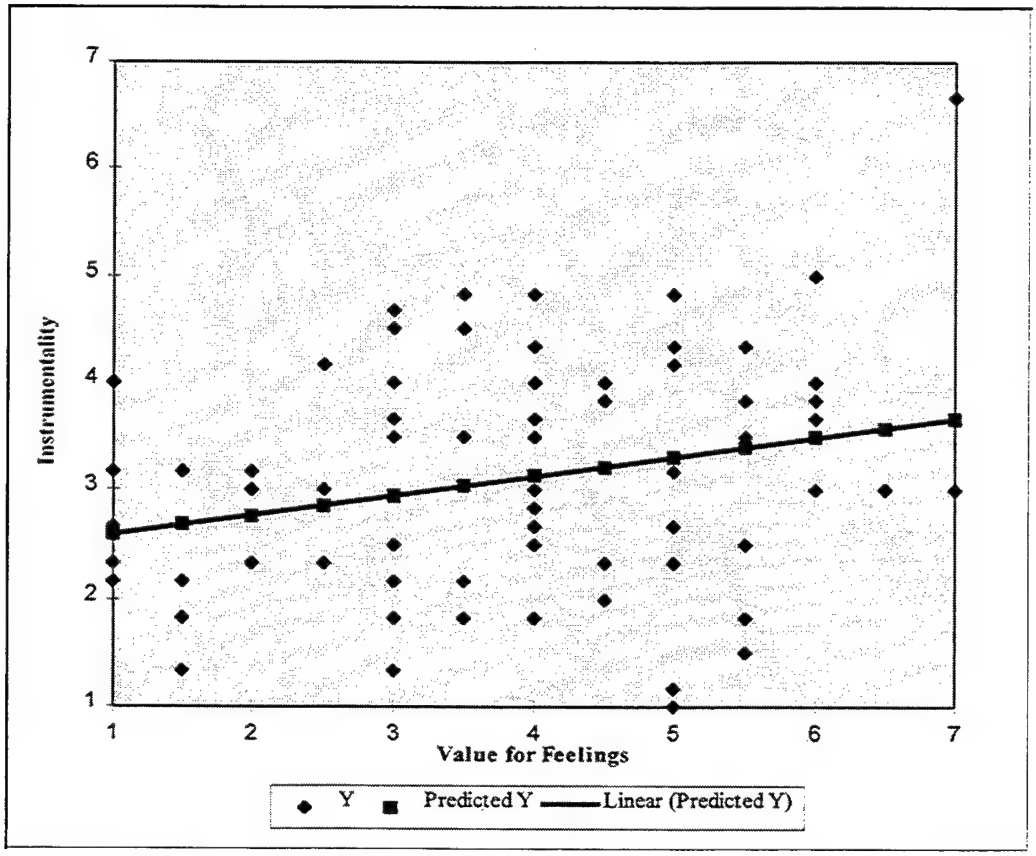

Figure 12. Instrumentality and Value for Feelings Line Fit Plot

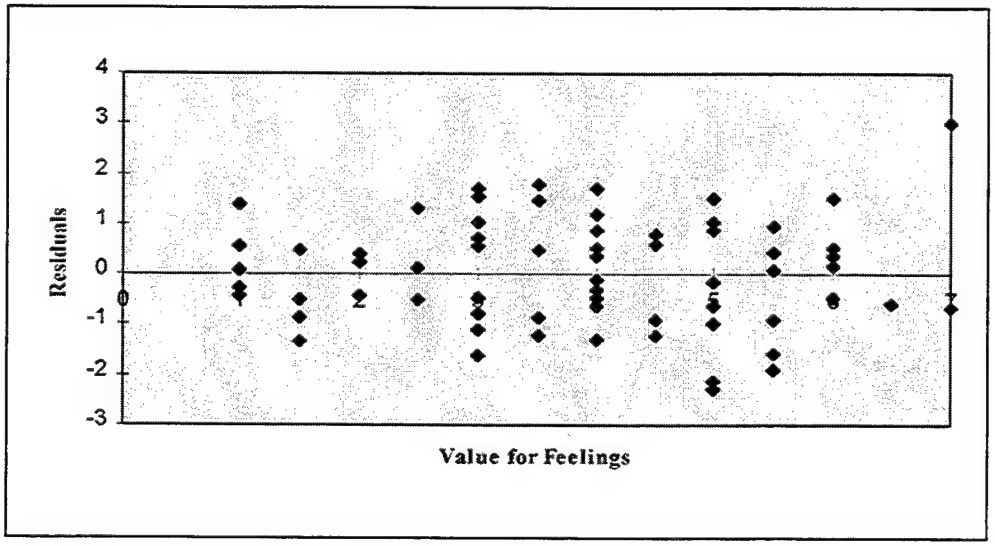

Figure 13. Instrumentality and Value for Feelings Residual Plot

Differentiation between Functional Areas

An ANOVA test was conducted to examine means of the functional areas. The responses were placed into one of five groups—the four largest functional areas (LA, EN, SC, and LS) plus a group labeled Support which contained the remaining offices. A significant difference between the means was discovered at the 0.05 level. Tukey-Kramer multiple comparisons were then performed to discover which group pairings were significantly different. To expedite the analysis, the differences between the means were rank ordered from the largest difference to the smallest. Analysis was then performed until the first insignificant difference was discovered. The results showed the mean values of LA and Support were different. Although statistically significant, there is no apparent justification for this difference. The ANOVA and Tukey-Kramer results are detailed in Appendix D and Appendix E respectively.

Analysis

This study set out to answer specific questions regarding individuals' attitude regarding information ownership and stewardship. In addition, expectations about the outcome of these questions were postulated. The statistical findings are discussed with respect to these questions and their associated postulations.

- **Can distinct definitions for information owners and stewards be provided?**

While no source provided an exacting definition of information owner or information steward, some research addresses the defining characteristics of each term. The discriminating, and therefore defining, characteristic that separates the

two terms is one's attitude regarding sharing information. Information owners, then, are individuals with an assumed absolute control over the information they possess; owners are reluctant to share this information. Information stewards, on the other hand, are individuals who realize they are maintaining the information on behalf of the organization; stewards are willing to share information for the good of the company.

- **Do individuals at AFIT view themselves strictly as information owners or is there a variety of attitudes concerning their responsibility for information?**

- **Individuals at AFIT will view themselves as owners of information.**

No evidence can be found to bolster the argument of an ownership attitude among the population; in fact, the opposite was shown to exist. The distribution of the Stewardship Attitude factor showed a leaning toward stewardship—mean of 5.07 and a standard deviation of 1.10. Furthermore, 75.68% of the respondents considered themselves to be information stewards. It is interesting, however, that only 52.05% of those sampled thought their coworkers behaved like information stewards. Therefore, this study does not support the postulation of a pervasive ownership attitude.

- **Do individuals within particular functional areas view themselves (as information owners or stewards) in a manner that is significantly different from the remaining functional areas?**

- **Individuals within SC will view themselves as information owners; this determination will be statistically significant from the remaining functional areas.**

In addressing the individual ownership issue, Plant alleges that "some of the sub-units of the organisation displayed ownership of their information" (1996:59). This study, then, studied examined the difference between the functional areas with respect to the identified factors. Differences between the first two factors—Stewardship Attitude and Instrumentality—were not statistical significant. The third factor—Value for Feelings—did have a difference between two of the functional areas. Statistical differentiation was found between LA and Support. Because there was no apparent distinction between SC and the other functional areas, the proposition failed to materialize.

Summary

Considering the validation results—testing content validity and reliability—the instrument provides strong evidence of construct validity and appears to be reasonably free from measurement error. The three factors resulting from the exploratory factor analysis were examined, in addition to the relationships between them. An emphasis of explainability was stressed to bolster the validity of the results. "Without a strong theoretical base, ... we will be unable to build a body of empirically supported theory, regardless of the statistical significance of individual results" (Goodhue, 1988:6). The results of this data analysis will be used to build models to assist future researchers.

V. Discussion

Overview

This chapter will explain the results highlighted in the previous chapter. Discussion regarding the larger significance and application of the study is made. Knowledge gained from this study is highlighted in order to focus future researchers on what is still not known.

Agent's Influence on Information Sharing

Plant's hypothesis of "ownership behaviours at [the] sub-unit level" (1996:7) is a postulation with respect to an individual's control over information. This factor, labeled Agent, acts as a gatekeeper—determining whether or not to share the information he or she possesses. The operationalization of the Agent control is a self report of the individual's intention to share.

Based on the analysis of the data, a three-construct model is proposed to describe the theoretical representation of the individuals' role in information sharing. The first construct, Stewardship Attitude, determines whether or not information sharing will take place. Constant and others support the pivotal role Stewardship Attitude plays.

> We believe the attitude that the organization really owns a valuable information outcome (even though the individual employee has physical possession or control of it) is one of the key attitudes underlying the transformation of sharing from a personal preference to a social good. Organizational ownership summarizes the idea that an employee's information work is really not his or hers to give or withhold selfishly, but must be used to satisfy organizational goals. (Constant and others, 1994:404)

Stewardship Attitude, in turn, is influenced by Instrumentality and Value for Feelings. Instrumentality is negatively related to Stewardship Attitude. If an individual is increasingly concerned with the amount of effort needed to obtain the information or worries "what is in it for me if I make this exchange?" then he or she is less likely to maintain a stewardship attitude. Likewise, Constant and others note, "Greater self interest reduces support of sharing...." (1994:400). Value for Feelings is also negatively related to Stewardship Attitude. Therefore, the more one allows simple reciprocity and other feelings to impact his or her decision to share, the less likely he or she will possess a stewardship attitude. "The negative influence assumes the information seeker previously has behaved negatively and that there is a personal cost to sharing—otherwise all signs would be positive" (Constant and others, 1994:406). Previous research supports these negative relationships; "self-interest [Instrumentality] and reciprocity [Value for Feelings] exert a direct negative influence on sharing" (Constant and others, 1994:406).

In addition, Instrumentality and Value for Feelings are interrelated; a positive relationship between the variables exists. The more a person is worried about "what is in it for me," the more likely he or she will allow personal feelings to effect the sharing decision. Figure 14 summarizes the nomological network.

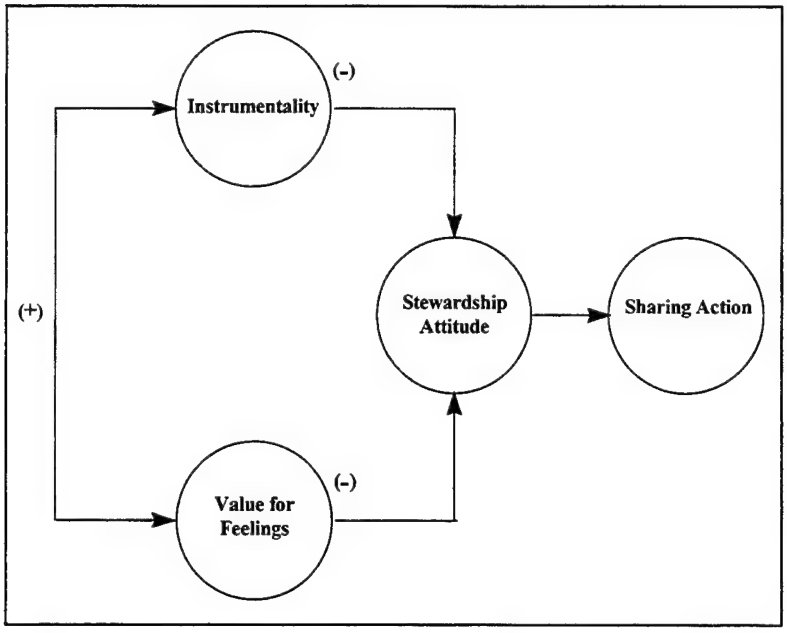

Figure 14. Influences on Stewardship Attitude

Information Sharing Model

Plant's hypothesis was that AFIT's failure to institutionalize and implement good IRM practices resulted from an information ownership attitude at the functional level. However, this study failed to support the existence of such an attitude. If Stewardship Attitude (Agent) does not play a significant role in the information sharing process, then *additional* factors must play more prominent roles. As discussed in chapter II, many factors influence whether or not one is likely to share the information he or she possesses. Indeed, trying to label the myriad determinants of sharing would be ludicrous.

The influences on information sharing, however, can be grouped into general categories and modeled. This study has suggested the existence of three additional factors that influence the sharing activity—Organizational Norms, Information Structure, and Information Channel. By adapting the general IDEF0 model, the process of sharing

information is revealed (McConnelly, 1997). This model is shown in Figure 15. The two controls, Agent and Organizational Norms, influence whether or not information sharing occurs—acting as gatekeepers. The mechanisms, Information Structure and Information Channel, are the tools that allow information to move throughout the organization

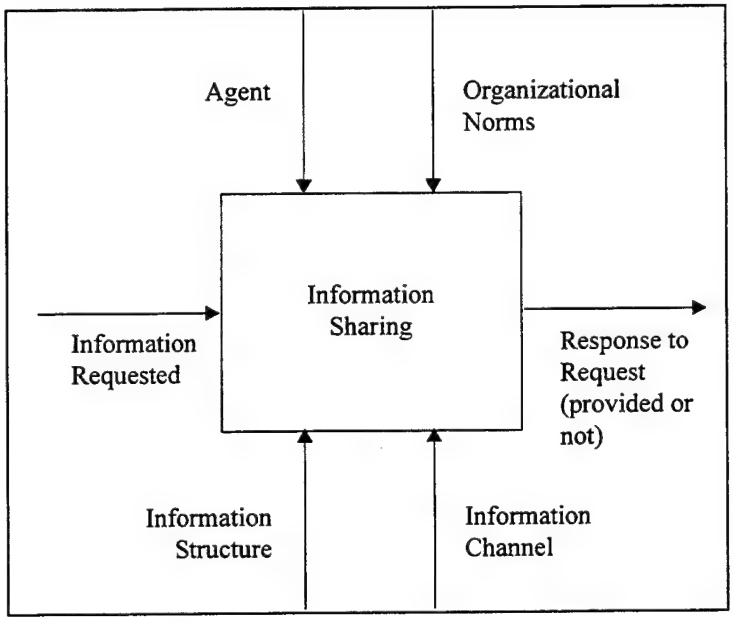

Figure 15. IDEF0 Model for Information Sharing Process

Several research efforts support the Information Sharing Process model. Most notable is the similarity between this study's model and the reasons people resist Management Information Systems (MIS). Markus highlights three reasons for resistance: internal factors (analogous to Agent), poor system design (Information Structure and Information Channel), and "the interaction of specific system design features with aspects of the organizational context of system use" (Organizational Norms) (1983:430). This

study's model, however, stresses the importance of information (Information Structure) by separating it from the technology that allows it to be used (Information Channel).

As further support, Barua and Ravindran introduce a two-stage model of the determinants of information exchange effectiveness. Their aggregate factors parallel those introduced in the Information Sharing Process model.

> We suggest that appropriate organizational outlook and social orientation [Organizational Norms] will foster effective information sharing by creating perceptions of continuity, reciprocity, cohesion and reputation. Further, IT factors such as IT resource equity [Information Channel] and communication of intent [Information Structure] also help increase information exchange effectiveness. (Barua and Ravindran, 1996:266)

Support also exists for using Agent and Organizational Norms as controls. One of the key assumptions in Constant and others' work was that "organizational culture and policies as well as personal factors can influence people's attitudes about information sharing" (1994:401).

Limitations

This study examined evidence of information ownership and stewardship by soliciting input from individuals at one organization. AFIT, however, may not be typical of other Air Force units or the larger world of organizations. Certainly, the peculiarities of AFIT (e.g., persistent rumors of closing the school, a high concentration of academics, etc.) must be examined to determine if *these* factors biased the results. Replications of the study, conducted at different units, are necessary to confirm the study's validity.

There is also a limitation related to using self-reported responses versus other methods of capturing the data (e.g., recording observations). Any differences noted may

be differences in perceptions rather than differences in attitudes towards sharing. In addition, there is no way of knowing (without testing) the impact these attitudes have on an individual's intentions and subsequent behaviors regarding sharing.

Evidence of a response bias exists. Except for one respondent's data, Stewardship Attitude values ranged from 3.17 to 7.00 on a 7-point scale. Likewise, Instrumentality ranged from 1.00 to 5.00 on the same scale. Apparently, there are negative connotations with being considered solely an information owner or being high on the Instrumentality scale.

Recommendations for Future Study

The empirical evidence did not support Plant's hypothesis of an information ownership attitude existing at the functional level. However, this finding does not negate his observations of AFIT's poor IRM practices. Therefore, other issues that influence whether an organization practices good IRM must exist. This study proposed three additional factors that deserve examination in future studies; future research should investigate the role Organizational Norms, Information Structure, and Information Channel have on information sharing.

The Information Sharing Process model was developed using exploratory factor analysis. Exploratory factor analysis "is generally considered to be ... a theory-generating" procedure. Confirmatory analysis, on the other hand, is "generally based on a strong theoretical and/or empirical foundation that allows the researcher to specify an exact factor model in advance" (Stevens, 1996:389). Therefore, confirmatory analysis is required to bolster the empirically supported theory.

An interesting observation was detected regarding how individuals see themselves and their coworkers. A wide distinction exists between the percentage that see themselves as information stewards (75.68%) versus the number that see their coworkers acting in a like manner (52.05%). Future studies could examine why this divergence exists and its impact on information sharing.

This study did not directly address additional factors such as tenure, knowledge level, and job responsibilities. Investigating additional elements may increase our understanding of the underlying mechanisms of sharing information.

Conclusions

Based on the exploratory factor analysis of this study's data, a model of Stewardship Attitude was proposed. Instrumentality and Value for Feelings were shown to affect individuals' attitudes regarding whether or not sharing occurs—Stewardship Attitude. However, the existence of a contrary attitude, Information Ownership, was not supported by this study's results. Therefore, the organization, technology, and information itself have a greater influence on sharing decisions.

Information sharing must occur, though, if an organization is to benefit from the synergistic advantages of IRM. Therefore, factors that encourage sharing information should be endorsed. Shakespeare echoed this sentiment long ago when he wrote, "What's mine is yours, and what is yours is mine" (1968:624).

Appendix A: Survey Instrument

You have been randomly selected to participate in a research study. The purpose of the study is to measure how people, specifically AFIT members, feel about information and their responsibility for it. To date, little evidence has been gathered on these subjects. Your participation will help further research by providing the required empirical data. This survey has been approved by the AFIT Commandant for distribution within AFIT IAW AFI 36-2601, paragraph 1.6.

Keith E. Kolekofski, Jr.
KEITH E. KOLEKOFSKI, JR., Major, USAF
ISM Master's Degree Candidate
Air Force Institute of Technology

PLEASE READ THESE INSTRUCTIONS THOROUGHLY BEFORE YOU PROCEED

- Section One consists of scales designed to measure your attitudes regarding information. The descriptions on each side of the scales represent opposite ends of a continuum

- **Assume the information discussed in all the questions does not require any special handling (i.e., it is not classified nor does it contain any sensitive, personal, or financial information). Also assume any "need to know" requirements have been met**

- **Please put an "X" above the number on the scale that best represents your attitude concerning information and your responsibility for it**

- Complete the survey in its entirety

- Return your survey in one of following three ways:

    1) Annotate your answers on this document and transmit it by return email to kkolekof@afit.af.mil

    2) Print out the survey, complete it, then return it through distribution. Address the "Holy Joe" to Maj Kolekofski, AFIT/LAA (GIS)

    3) Print out the survey, complete it, then fax it to 656-7988. Address the cover sheet to Maj Kolekofski, AFIT/LAA (GIS)

continued on next page ...

Item 1 .. (i1r)

Factor B (Reverse scored) ← *Owner ..... Steward* →

1	2	3	4	5	6	7
I am inclined to share small amounts of information						I am inclined to share information regardless of its size

Item 2 .. (i2)

Factor A ← *Steward ..... Owner* →

1	2	3	4	5	6	7
My first tendency is to share information if someone requests it						My first tendency is to protect, and therefore not share information, if someone requests it

Item 3 ... (i3r)

Deleted (Reverse scored) ← *Owner ..... Steward* →

1	2	3	4	5	6	7
I consider the information's form when deciding whether to share it						I am willing to share information regardless of its form

Item 4 ... (i4r)

Factor A (Reverse scored) ← *Owner ..... Steward* →

1	2	3	4	5	6	7
Information belongs to the office or project for which it is used						Information belongs to the whole organization regardless of who is using it

Item 5 .. (i5)

Factor A ← *Steward ..... Owner* →

1	2	3	4	5	6	7
Information should be freely shared						Information should be tightly controlled

continued on next page ...

Item 6 .. (i6)
Factor A ← *Steward* ..... *Owner* →

1	2	3	4	5	6	7
I agree when organizations encourage sharing information within the unit						I agree when organizations encourage employees to tightly control information

Item 7 .. (i7)
Deleted ← *Steward* ..... *Owner* →

1	2	3	4	5	6	7
Sharing information is mainly beneficial to the recipient						Sharing information is mainly beneficial to the provider

Item 8 .. (i8)
Factor A ← *Steward* ..... *Owner* →

1	2	3	4	5	6	7
I tend to make information available throughout the organization						I tend to limit access to information to individuals within my office or project

Item 9 ... (i9r)
Deleted (Reverse scored) ← *Owner* ..... *Steward* →

1	2	3	4	5	6	7
Information's value is increased if it is tightly maintained						Information's value is increased if it is shared

continued on next page ...

Item 10 .. (i10)

Factor C ← *Steward ..... Owner* →

1	2	3	4	5	6	7
I am likely to share information regardless of how requester treated me in the past						When making decisions to share information, I consider how the requester treated me in the past

Item 11 ... (i11r)

Deleted (Reverse scored) ← *Owner ..... Steward* →

1	2	3	4	5	6	7
I regard an organization that promotes sharing information as an exception to the rule						I regard an organization that promotes sharing information as the rule rather than the exception

Item 12 .. (i12)

Deleted ← *Steward ..... Owner* →

1	2	3	4	5	6	7
Information mainly benefits the organization as a whole						Information mainly benefits the person, office, or project that possesses it

Item 13 ... (i13r)

Factor B (Reverse scored) ← *Owner ..... Steward* →

1	2	3	4	5	6	7
I am willing to share information if the amount requested is reasonable						I am willing to share information regardless of its size

continued on next page ...

Item 14 .. (i14)

Factor A ← *Steward ..... Owner* →

1	2	3	4	5	6	7
I am willing to share information regardless of its worth						The information's worth determines whether I share it

Item 15 ... (i15r)

Factor C (Reverse scored) ← *Owner ..... Steward* →

1	2	3	4	5	6	7
A person's actions toward me in the past affect whether I share information with him or her						I am willing to share information regardless of how a person treated me in the past

Item 16 ... (i16r)

Factor B (Reverse scored) ← *Owner ..... Steward* →

1	2	3	4	5	6	7
I mainly view information as a symbol of power for whoever possesses it						I mainly view information as a resource for the organization

Item 17 ... (i17r)

Factor B (Reverse scored) ← *Owner ..... Steward* →

1	2	3	4	5	6	7
Only information of sufficient value is worth sharing						Information of any value is worth sharing

continued on next page ...

Item 18 .. (i18)
Deleted ← *Steward* ..... *Owner* →

1	2	3	4	5	6	7
I am willing to share information regardless of its form						The information's form affects my decision to share it

Item 19 ... (i19r)
Factor B (Reverse scored) ← *Owner* ..... *Steward* →

1	2	3	4	5	6	7
Information mainly benefits the office that maintains it						Information mainly benefits the entire organization

Item 20 ... (i20r)
Factor B (Reverse scored) ← *Owner* ..... *Steward* →

1	2	3	4	5	6	7
I question why individuals require the information I possess						I am generally open-minded to requests for the information I possess

For the *next* two questions, use the following definitions:

Information Owner: Individual who is the ultimate authority for information including all associated rights and responsibilities

Information Steward: Individual who manages information on behalf of others

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Item 21 ... (i21)
Do you consider yourself to be an information owner or an information steward? Please put an "X" by your answer.

(1) Owner
(0) Steward

Item 22 ... (i22)
My coworkers at AFIT behave as if they are information _____. Please put an "X" by your answer.

(1) Owner
(0) Steward

Please provide the following demographic information. Your responses will remain confidential and will be used only to validate the research.

continued on next page ...

Office Symbol: _____ (Off)

1 = CC	4 = LA	7 = LD	10 = PA	13 = SC
2 = CI	5 = XO	8 = MS	11 = CE	
3 = LS	6 = RR	9 = RP	12 = EN	

How many years have you been assigned to AFIT? _____ (AFIT)

Are you responsible for procuring or maintaining a computerized information system? (Resp) ___(1) yes ___(0) no

How would you rate your knowledge of computerized information systems on the scale below? (Know)

(1)	(2)	(3)	(4)	(5)
Novice	Somewhat Knowledgeable	Average	Very Knowledgeable	Expert

---

Please feel free to include any additional remarks regarding this survey or your responses.

Thank-you for your participation.

Appendix B: Survey Data

Obs	i1r	i2	i3r	i4r	i5	i6	i7	i8	i9r	i10	i11r	i12	i13r	i14	i15r	i16r	i17r	i18	i19r	i20r	i21	i22	Off	AFIT	Resp	Know
1	5	2	5	2	3	3	2	3	7	6	5	2	1	3	2	6	5	3	5	2	0	0	4	13.5	1	4
2	6	3	3	3	3	2	4	5	5	5	7	2	4	6	5	7	5	5	5	3	0	0	9	0.5	1	3
3	5	1	3	5	2	1	5	1	6	2	5	2	4	1	5	6	5	4	5	5	0	0	6	15	0	2
4	4	6	5	2	3	1	2	2	6	2	2	4	2	2	6	6	6	2	6	6	0	0	13	5	0	3
5	7	4	6	6	4	2	4	2	6	3	4	2	6	6	3	7	3	2	6	2	0	1	3	5	0	3
6	7	5	2	7	4	4	4	1	4	1	1	1	5	2	7	7	7	1	7	2	0	1	13	1.75	1	4
7	4	3	3	6	4	4	4	2	4	2	2	1	3	1	5	6	3	6	6	1	0	1	5	3	1	3
8	6	4	3	3	3	2	3	4	4	4	3	3	3	1	5	7	7	3	7	5	0	0	12	1	0	3
9	4	2	3	3	2	1	3	5	6	5	3	4	3	5	3	5	3	5	3	4	0	0	3	1	0	3
10	2	2	2	2	2	6	4	3	4	4	6	2	6	3	4	5	2	2	2	2	0	1	3	4	1	4
11	6	2	1	3	2	1	3	1	7	3	2	1	5	6	7	7	3	2	5	3	0	0	6	3	1	3
12	6	1	6	6	1	1	4	4	3	6	5	1	4	1	2	3	2	1	6	5	0	0	4	20	0	3
13	5	2	5	4	3	2	2	2	6	3	2	2	6	6	5	7	5	2	6	6	1	1	12	2	1	4
14	7	1	7	7	1	1	1	1	7	5	4	1	7	1	3	7	7	1	7	7	0	1	4	20	1	3
15	5	2	2	3	4	2	3	5	5	6	4	3	3	5	2	5	4	5	5	3	0	1	13	4.5	0	3
16	4	5	3	4	6	5	4	5	4	5	4	4	3	4	4	5	5	6	5	3	0	0	4	13	1	3
17	7	3	5	6	1	1	4	1	7	3	6	6	.	5	.	7	7	.	.	5	0	1	12	1.5	.	3
18	3	4	6	2	3	6	3	4	2	5	6	2.	2	5	5	6	5	6	2	4	1	1	12	5	0	3
19	4	4	5	2	2	2	3	3	7	4	3	2	.	2	4	7	5	5	5	3	0	1	12	4	0	3
20	5	5	3	1	3	3	3	5	5	6	4	3	3	4	3	6	5	5	5	1	0	0	2	0.5	1	3
21	6	1	6	6	1	1	4	1	7	1	4	2	5	1	6	6	7	2	6	5	0	1	13	0.417	1	3
22	6	2	7	5	2	2	3	2	5	2	7	2	7	2	5	5	5	2	6	5	0	0	7	1	1	4
23	5	1	1	1	3	1	3	4	3	7	7	1	7	7	3	3	1	3	7	7	1	0	13	2	1	4
24	6	1	6	5	1	1	5	3	5	3	3	2	6	1	5	6	5	1	6	4	0	0	8	15	0	4
25	5	1	3	3	4	1	4	2	6	5	6	1	5	1	2	5	1	3	6	5	0	0	3	1.5	0	2
26	5	2	1	7	1	2	1	1	7	2	2	7	6	1	2	7	6	2	6	2	1	.	2	1	0	2
27	4	2	6	3	2	1	3	3	5	6	4	2	3	3	1	5	6	3	6	6	0	0	4	10	0	3
28	6	4	2	6	3	2	4	2	7	2	5	1	6	6	7	7	7	2	7	7	0	0	7	.	.	4
29	6	2	3	6	1	1	3	2	7	5	2	1	5	2	2	7	6	2	7	6	0	0	4	3	0	3
30	6	1	2	6	2	2	3	2	6	5	5	2	2	3	2	4	5	5	5	5	1	1	12	8	0	1
31	5	1	3	5	2	2	4	1	6	5	2	1	5	2	5	6	3	4	5	6	0	0	12	20	0	2
32	7	4	2	6	2	1	4	1	7	5	4	1	7	1	2	7	7	1	4	7	0	1	13	1	1	3
33	6	1	4	3	2	1	4	5	5	7	1	4	4	5	1	6	4	4	4	6	.	.	4	16	0	3
34	6	2	6	4	3	2	4	3	5	5	4	2	5	3	3	5	5	3	5	3	1	1	12	4	0	2
35	5	3	5	5	2	1	2	2	7	3	5	5	3	2	3	6	3	2	2	5	0	0	1	1	0	1
36	5	2	3	3	3	2	2	3	4	3	2	5	4	5	3	6	5	4	3	4	1	1	12	4	1	5
37	5	3	5	4	4	3	4	2	4	3	3	4	4	4	3	5	5	.	4	3	0	0	13	3.5	0	3
38	5	3	4	4	5	4	5	2	4	4	5	5	3	4	3	3	5	4	4	4	0	.	3	.	0	2
39	4	5	4	2	4	3	2	5	5	6	3	4	4	6	2	6	4	4	4	4	0	1	12	3	0	5
40	6	1	4	6	2	1	1	5	7	2	5	2	5	2	6	6	6	2	5	6	1	1	12	4	0	2
41	5	4	5	5	4	3	3	3	3	5	4	4	5	3	3	6	6	2	6	6	0	0	8	1.167	1	4

Obs	i1r	i2	i3r	i4r	i5	i6	i7	i8	i9r	i10	i11r	i12	i13r	i14	i15r	i16r	i17r	i18	i19r	i20r	i21	i22	Off	AFIT	Resp	Know
42	7	1	1	7	1	1	3	1	7	1	7	1	7	1	6	7	2	7	7	7	0	0	12	.	1	3
43	3	3	5	6	7	5	4	6	7	4	7	4	6	2	4	7	2	4	7	7	0	1	7	25	1	3
44	6	3	2	2	4	2	2	5	5	2	3	5	6	7	7	7	2	6	5	3	0	0	13	3	1	4
45	7	2	6	3	2	2	2	3	4	4	3	3	6	3	3	5	6	3	5	5	0	0	4	20	0	2
46	7	1	5	7	1	1	4	1	7	3	7	1	5	1	5	7	7	5	7	7	0	0	3	0.167	1	3
47	5	1	6	5	2	1	4	1	6	1	4	1	6	1	6	6	6	1	6	6	0	1	6	18	1	2
48	7	1	2	6	1	1	3	1	7	5	3	1	7	1	3	7	7	2	7	7	0	0	7	6.5	1	3
49	5	2	4	5	2	1	4	2	6	1	5	2	5	4	7	7	2	2	6	4	.	.	5	8	0	3
50	6	2	6	2	2	2	2	2	6	4	6	2	6	5	3	6	6	2	6	6	0	0	9	5	1	4
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57	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
58	6	2	2	4	3	2	4	2	5	3	3	4	2	5	3	6	3	3	4	3	0	0	13	0.167	1	5
59	5	1	6	5	1	1	4	1	7	5	1	3	3	5	7	3	3	7	7	5	1	1	2	1.5	0	3
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84	5	2	6	4	3	3	2	4	4	4	4	3	6	3	5	6	6	2	6	6	1	1	12	20	0	3
85	6	2	6	6	2	2	4	2	7	3	3	2	6	2	5	7	7	2	6	5	1	1	4	4	0	3

Appendix C: Normal Probability Plots

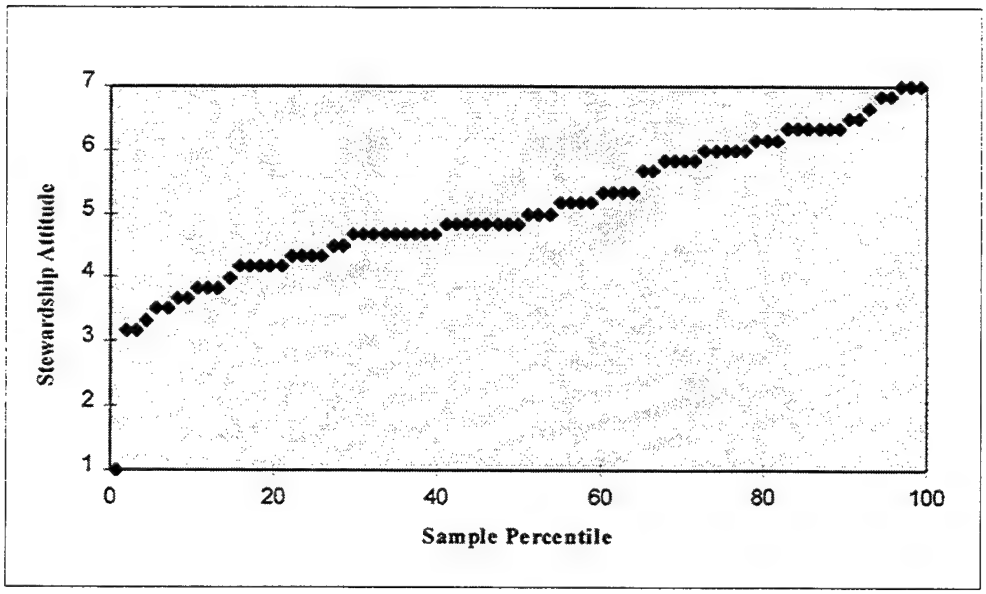

Figure 16. Normal Probability Plot for Stewardship Attitude

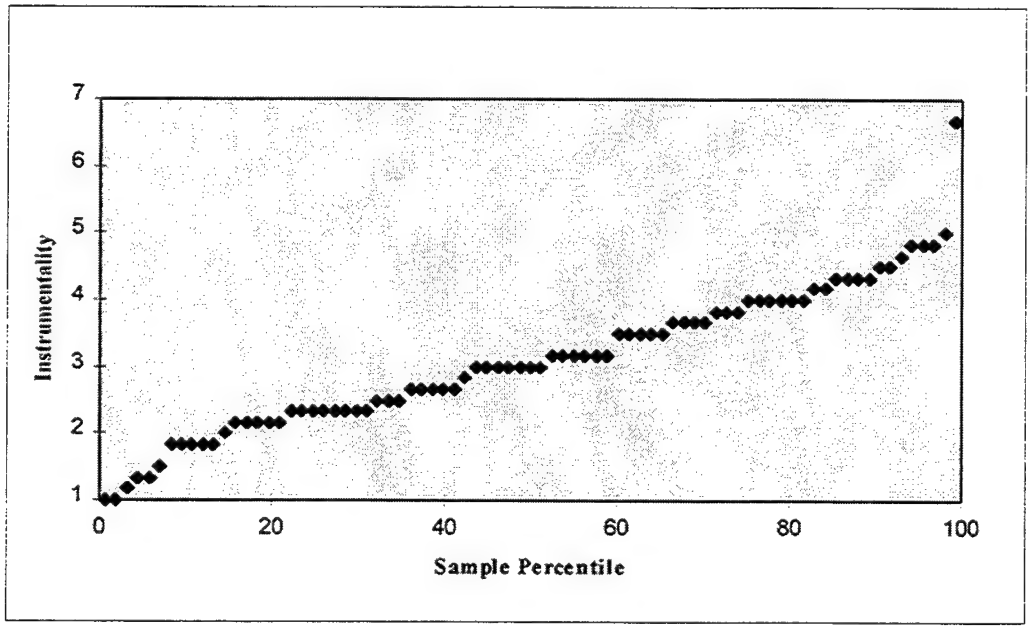

Figure 17. Normal Probability Plot for Instrumentality

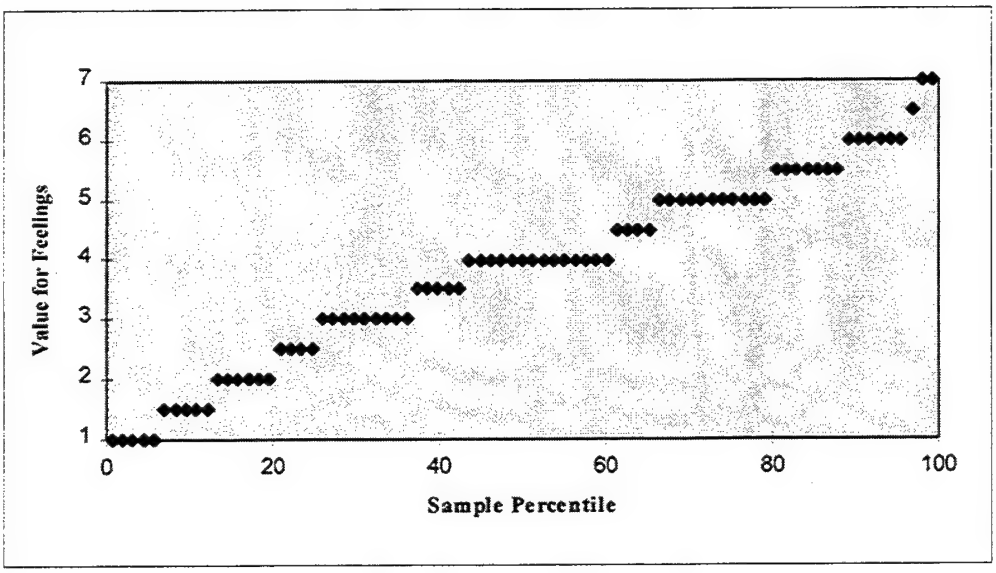

Figure 18. Normal Probability Plot for Value for Feelings

Appendix D: ANOVA Results on Factors

Table 11. ANOVA Results for Stewardship Attitude

SUMMARY						
Groups	Count	Sum	Average	Variance		
Support	24.00	121.50	5.06	1.78		
LS	14.00	72.00	5.14	0.96		
LA	11.00	60.00	5.45	1.07		
EN	20.00	99.17	4.96	0.91		
SC	11.00	52.17	4.74	1.02		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	3.12	4.00	0.78	0.64	0.64	2.49
Within Groups	91.67	75.00	1.22			
Total	94.79	79.00				

Table 12. ANOVA Results for Instrumentality

SUMMARY						
Groups	Count	Sum	Average	Variance		
Support	24.00	72.67	3.03	1.32		
LS	14.00	44.03	3.15	1.47		
LA	11.00	31.67	2.88	1.15		
EN	20.00	63.53	3.18	1.11		
SC	11.00	33.17	3.02	0.61		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.78	4.00	0.20	0.17	0.96	2.49
Within Groups	88.26	75.00	1.18			
Total	89.04	79.00				

Table 13. ANOVA Results for Value for Feelings

SUMMARY						
Groups	Count	Sum	Average	Variance		
Support	24.00	78.50	3.27	2.30		
LS	14.00	50.00	3.57	1.61		
LA	11.00	55.50	5.05	1.62		
EN	20.00	81.50	4.08	1.64		
SC	11.00	41.00	3.73	3.62		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	26.01	4.00	6.50	3.10	0.02	2.49
Within Groups	157.46	75.00	2.10			
Total	183.47	79.00				

Appendix E: Tukey-Kramer Results

Table 14. Tukey-Kramer Multiple Comparisons on Value for Feelings

Mean LA	5.05
n LA	11.00
Mean EN	4.08
n EN	20.00
Mean SC	3.73
n SC	11.00
Mean LS	3.57
n LS	14.00
Mean Support	3.27
n Support	24.00
MSW	2.10
Q Statistic	3.965
Comparison of LA to Support	
Absolute Difference	1.774621212
Standard Error of Difference	0.373059494
Critical Range	1.479180895
Means of LA and Support are	**Different**
Comparison of LA to LS	
Absolute Difference	1.474025974
Standard Error of Difference	0.412815203
Critical Range	1.636812278
Means of LA and LS are	**Not Different**

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Vita

Major Keith E. Kolekofski, Jr. hails from Newport News VA, where he graduated from Denbigh High School and earned an appointment to the US Air Force Academy. Upon graduation from the academy, he earned his commission as an Air Force officer and a Bachelor of Science Degree in Operations Research.

His first assignment was helicopter flight training at Ft Rucker AL where he earned his wings. He is a senior pilot with over 2400 hours. In addition to the many accolades he received during his flying career, he was credited with saving the life of a new-born following a successful medical evacuation. Major Kolekofski also served as the wing commander's executive officer at Andrews Air Force Base.

His education also includes a Bachelor of Science Degree in Management Information Systems from the University of Tampa and a Master of Business Administration Degree from Embry-Riddle Aeronautical University. He is a graduate of Squadron Officers' School in residence and Air Command and Staff College by seminar.

He was selected to attend the Air Force Institute of Technology (AFIT) and will achieve a Master of Science Degree in Information Systems Management upon graduation. He was invited to present his thesis research at the Society of Technical Communication regional conference. Following graduation, he will be assigned as a Communications Officer at the Air Force Communications and Information Center in Washington DC.

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13. ABSTRACT *(Maximum 200 words)*

Despite beliefs in the benefits of good Information Resources Management (IRM) practices, executives still find their organizations plagued by outdated, inconsistent, and unavailable information. This information is often stored in disparate, stand-alone systems spread throughout the business. The Air Force Institute of Technology (AFIT) fails to reap the synergistic benefits of shared information despite its bounty of information systems and proclamations for IRM principles. A previous researcher postulated that this disconnect may be explained, in part, by an ownership attitude at the functional level.

Empirical evidence gathered from a survey of AFIT's members failed to support Plant's hypothesis. Exploratory factor analysis of the data revealed three constructs that may help explain information sharing from the individual's point of view. In addition, a model of factors that contribute to information sharing is proposed.

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The purpose of this questionnaire is to determine the potential for current and future applications of AFIT thesis research. **Please return completed questionnaire** to: AIR FORCE INSTITUTE OF TECHNOLOGY/LAC, 2950 P STREET, WRIGHT-PATTERSON AFB OH 45433-7765. Your response is **important.** Thank you.

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2. Do you believe this research topic is significant enough that it would have been researched (or contracted) by your organization or another agency if AFIT had not researched it?
a. Yes b. No

3. **Please estimate** what this research would have cost in terms of manpower and dollars if it had been accomplished under contract or if it had been done in-house.

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